

# **Air Force Civil Engineer Center**

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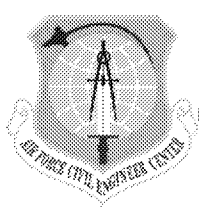
***FORMER  
WILLIAMS AIR FORCE BASE***

**Site ST012  
Former Liquid Fuels Storage Area  
Remedial Action**

**BCT Meeting  
24 August 2016**

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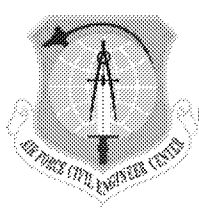
***Battle Ready...Built Right!***



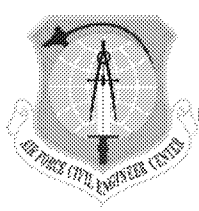
# Williams AFB

## ~~BRAC Cleanup Team Meeting~~

Time	Agenda Item	Est. Time
8:30-8:40	Welcome and Agenda Review	10 min
8:40-10:30	<b>ST012 Update</b> <ul style="list-style-type: none"><li>• Summary of Site Activities (last 30 days)</li><li>• Evaluation of EBR Baseline Data</li><li>• Response to EPA and ADEQ Comments</li></ul>	110 min
10:30-10:45	<b>Break</b>	15 min
10:45-12:00	<b>ST012 Update con't</b>	75 min
12:00-12:30	<b>Lunch provided</b>	30 min
12:30-1:30	<b>ST012 Update con't</b>	60 min
1:30-2:15	<b>LF004 and FT002 Update</b>	45 min
2:15-2:30	<b>SS017 Update</b>	15 min
2:30-2:45	<b>Break</b>	15 min
2:45-3:00	<b>Five Year Review</b>	15 min
3:00-3:15	<b>ST035 Update</b>	15 min
3:15-3:30	<b>2016 Meeting/Conference Call Schedule Deliverable Status Review</b>	15 min
3:30-3:45	<b>BCT General Update Stakeholder Items</b>	15 min
3:45-4:00	<b>Action Items</b>	15 min
4:00	<b>BCT Meeting Adjourn</b>	

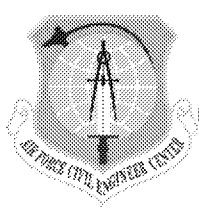


- **Introduction**
- **Site Activities Update (last 30 days)**
- **Evaluation of Phase 1 Data**
- **Path Forward**
- **Response to EPA and ADEQ Comments**

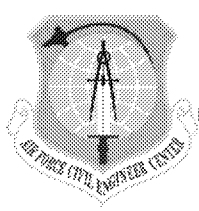


# **~~ST012 Introduction~~**

- **Update since June BCT Meeting**
  - **28 June 2016 – EPA/ADEQ joint letter requesting halt to all activities related to decommissioning the SEE system and procuring for and constructing the EBR system**
  - **1 July 2016 – AF letter acknowledging suspension of SEE decommissioning and EBR construction**
  - **11 and 20 July 2016 – Two meetings between AF, EPA, ADEQ managers (Phil, Angeles, Tina)**
  - **28 July 2016 – EPA/ADEQ Invokes Informal Dispute**
  - **17 August 2016 – ADEQ comments on ST012 OMM Reports**
- **Characterization and containment are priorities**

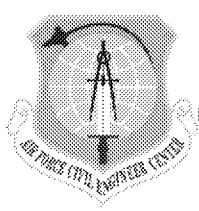


- **Temporary halt for SEE decommissioning and EBR construction**
- **Enhancement and optimization of deep SVE**
- **Ongoing**
  - **SVE**
  - **LNAPL monitoring and removal**
  - **Water level and temperature monitoring**
- **Phase 1 Characterization completed**

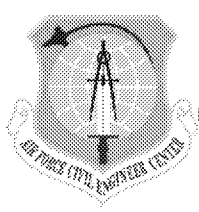


# **Phase 1 Post-Steam Investigation**

- **Evaluation of Phase 1 Results**
  - **Bottom Line**
    - An additional round of borings and wells is recommended for LNAPL or dissolved phase characterization
    - Actions are recommended to achieve active containment capability
- **The Air Force is committed to remedy performance and achieving remedy objectives**
- **Activities for Phase 2 Post-Steam Investigation and Containment Construction can start immediately**

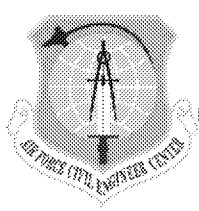


- **PBR objectives are designed to achieve ROD objectives**
- **AF Oversight and Management**
  - **All deliverables and responses to comments are reviewed, approved and issued by the AF**
  - **AF reviews and provides input to all presentation materials**
  - **Reviews and input on PBR approaches to achieve ROD objectives are a consistent and integrated component**
- **AF is the ROD signatory and heavily involved in primary, secondary and operational documents**
- **Presentations are performed based on project and technical responsibilities. AF manages the overall program.**
- **Direct discussion between regulatory and AF BCT members is encouraged at any and all times, including throughout the BCT meetings.**

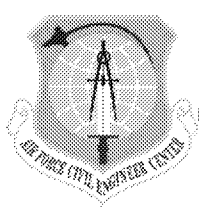


# **ST012**

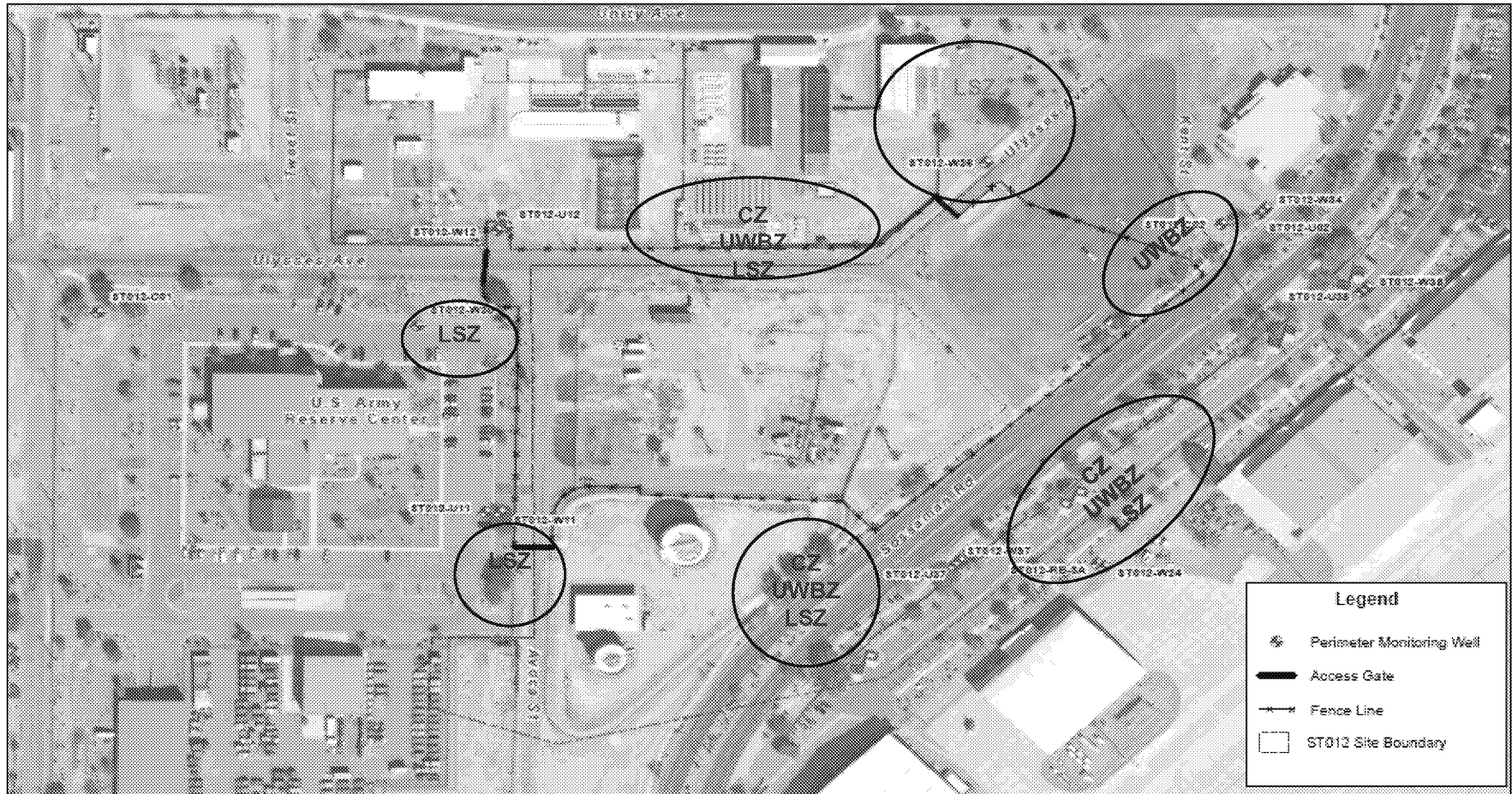
# **Additional Characterization**



- **Summary of Additional Characterization**
  - Focused on areas of past ADEQ/EPA concern
  - Updated LNAPL interpretations with recent Phase 1 data
  - Phase 2 Additional Characterization consists of
    - 10 additional LNAPL characterization borings
    - 13 additional groundwater monitoring wells
    - Some locations may be combined
  - Construct extraction and treatment capability for active containment



# Site ST012 EPA/ADEQ Concerns for LNAPL and Groundwater (Benzene) Characterization



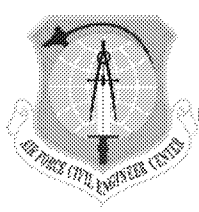
Red – LNAPL and dissolved phase

Green – dissolved phase

Blue – LNAPL

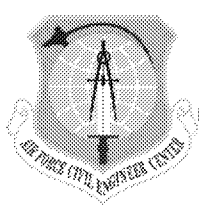


Area of EPA/ADEQ comment

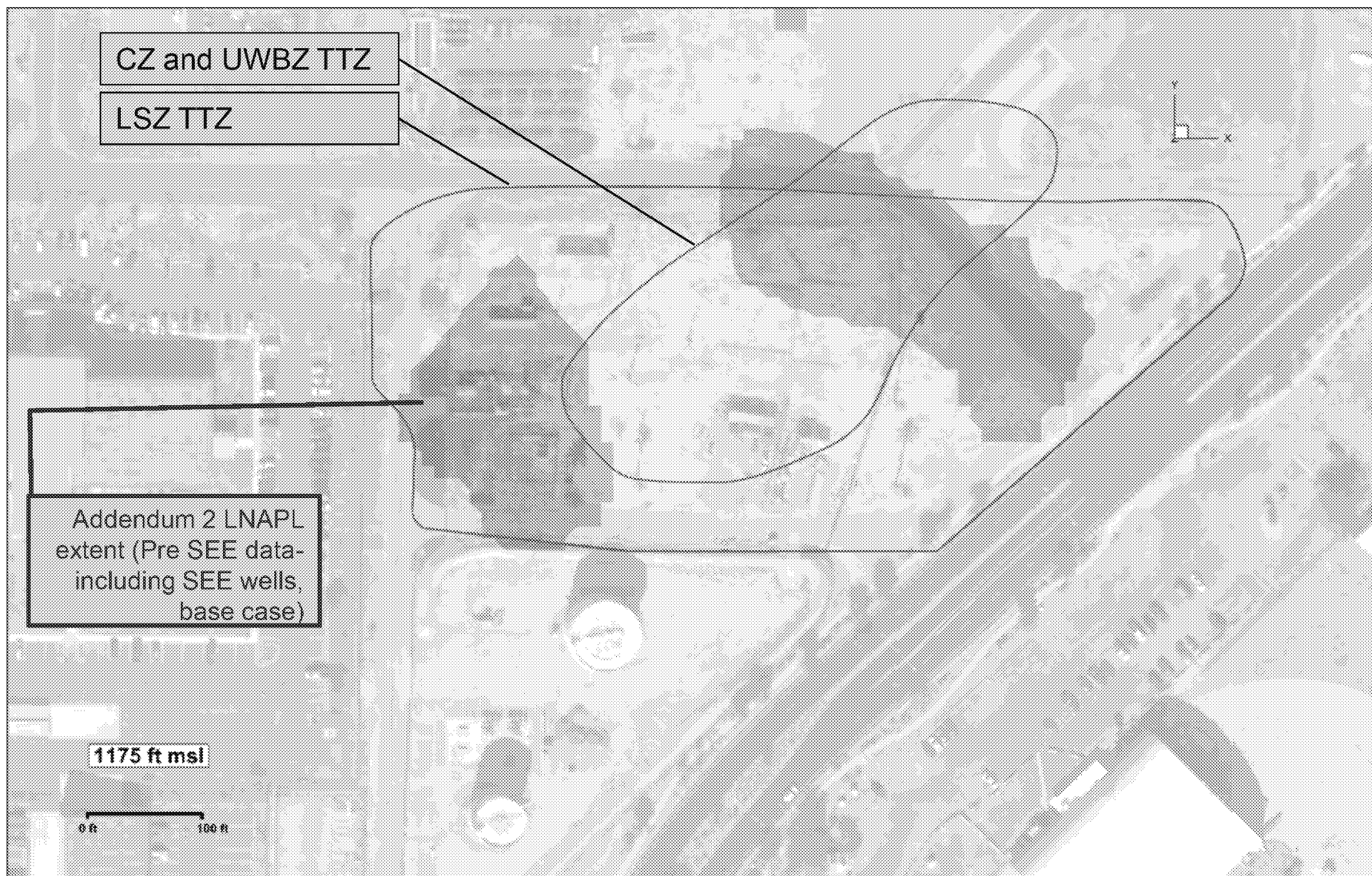


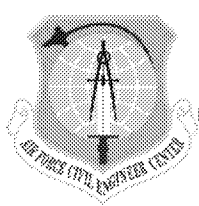
# **Site ST012 Additional Characterization**

- **Review of LNAPL Delineation**
  - **Historical logs/interpretations**
  - **Update with**
    - **New well dye test kit results (supported by analytical)**
    - **LNAPL observations in wells (through 8/5/16)**
    - **LNAPL removed (through 8/5/16)**



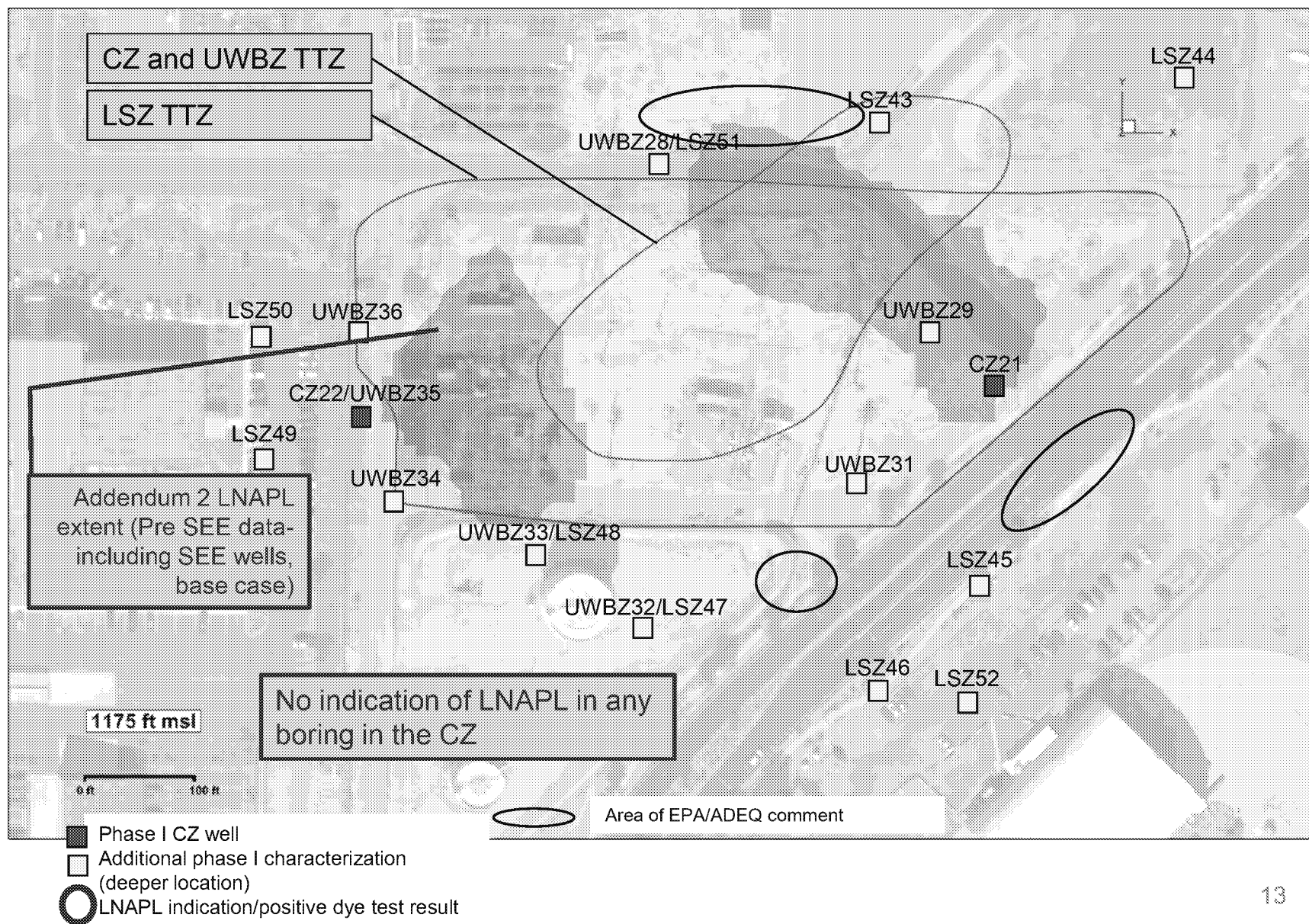
# Evaluation of CZ LNAPL Characterization Based on Pre SEE Data

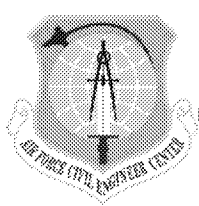




# Evaluation of CZ LNAPL Characterization

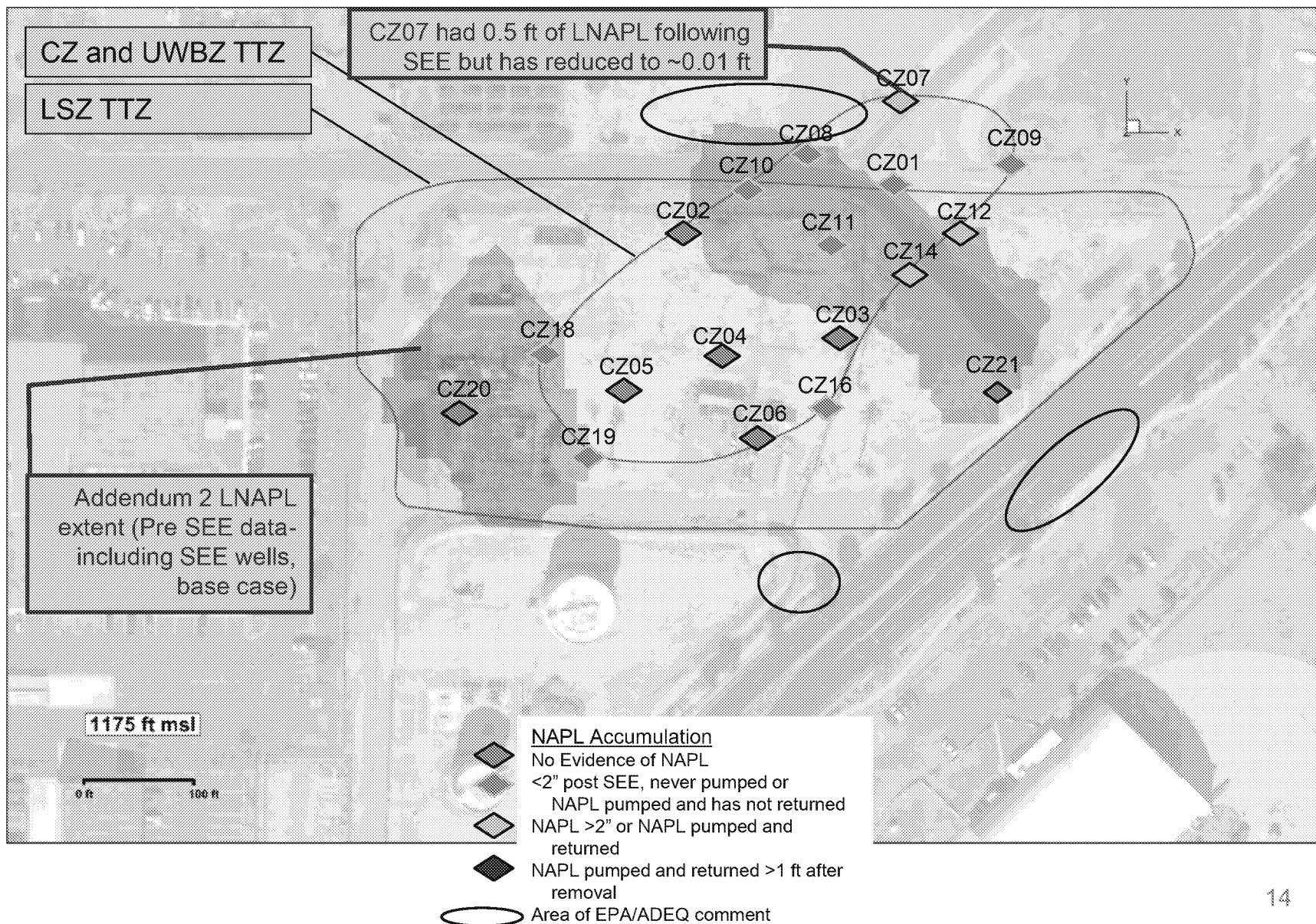
## Indications/Dye Test

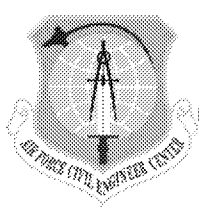




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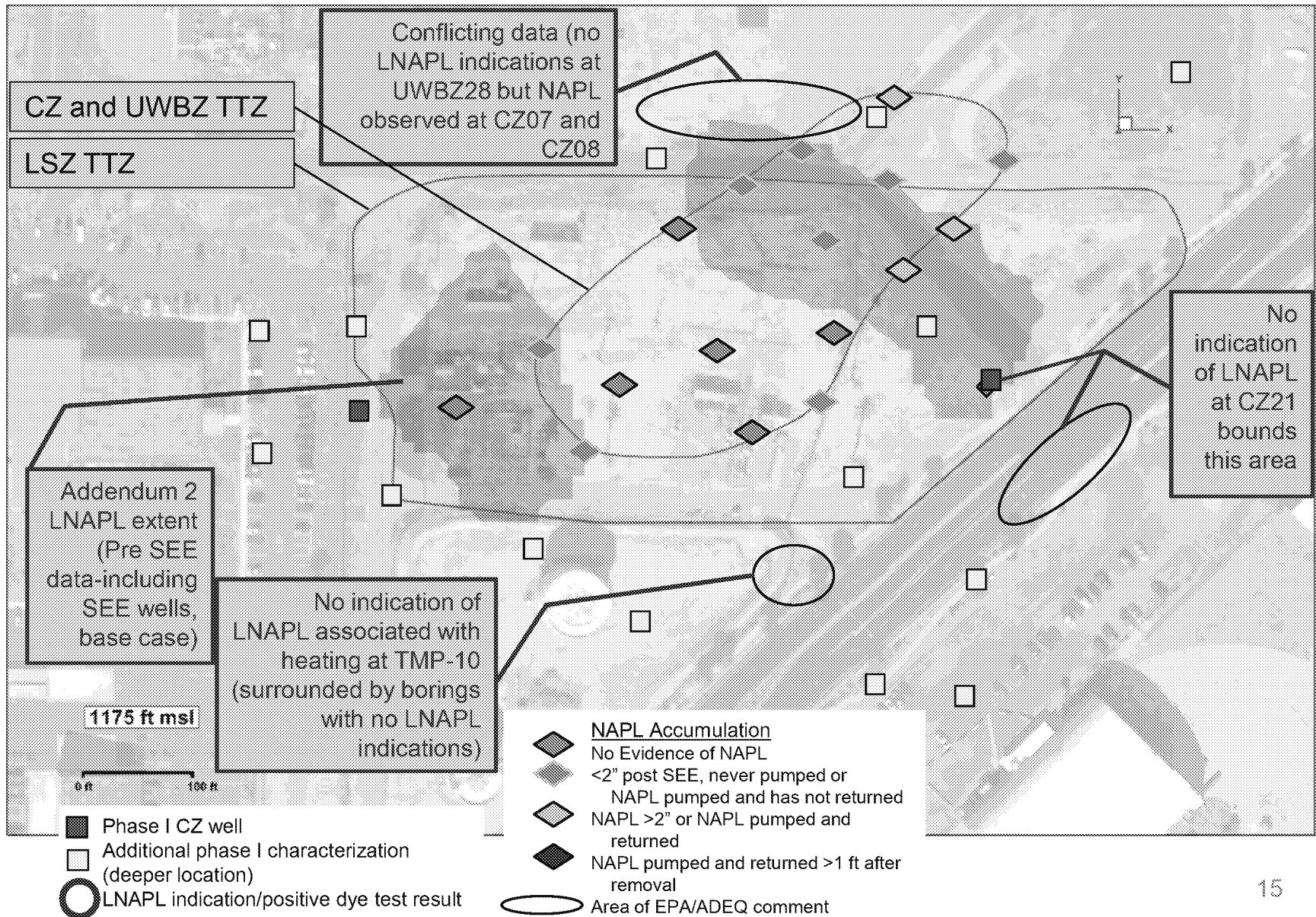
## Post SEE LNAPL Presence

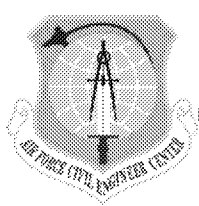




# Evaluation of CZ LNAPL Characterization

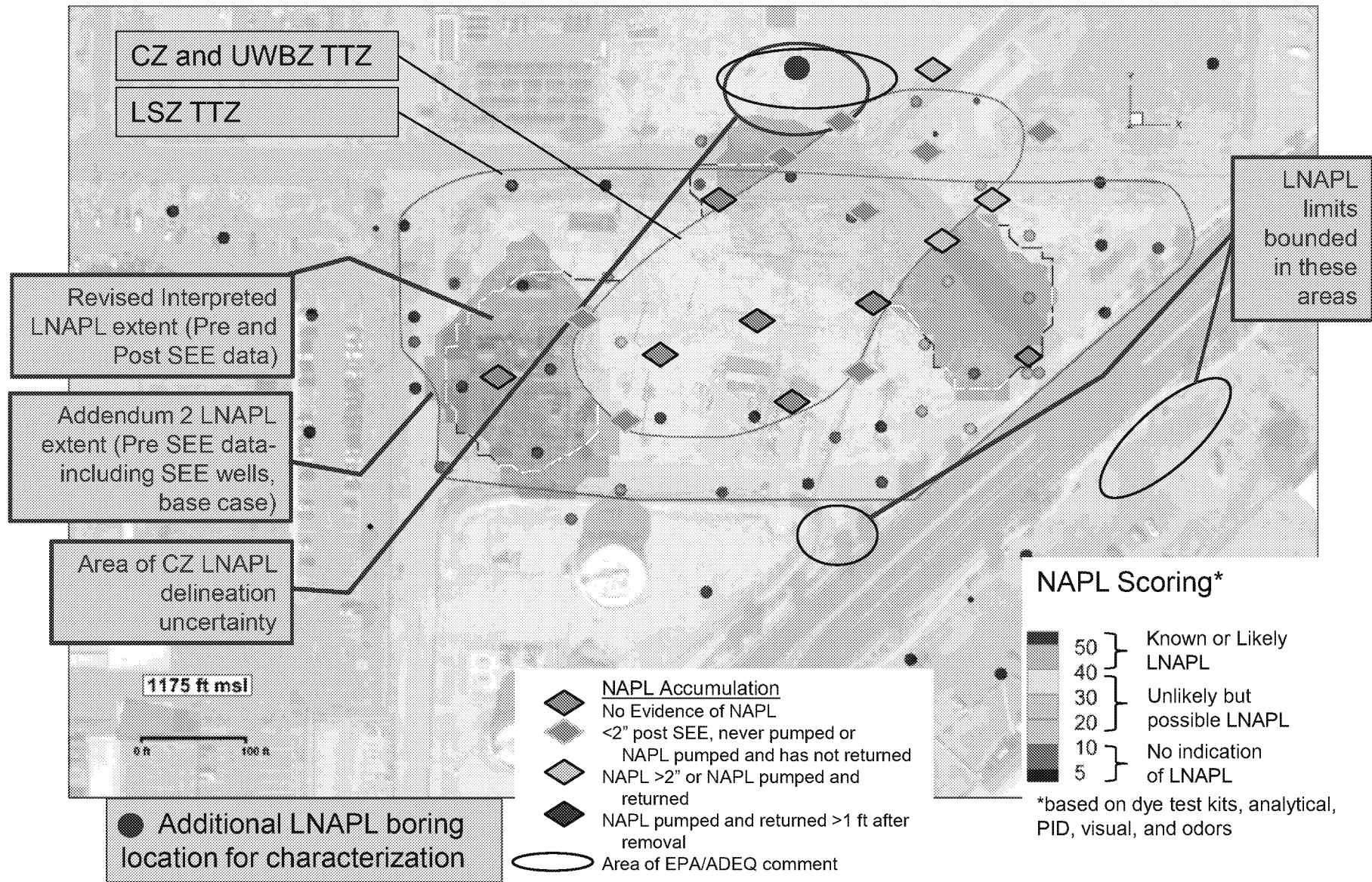
## Summary of Phase 1 LNAPL Data

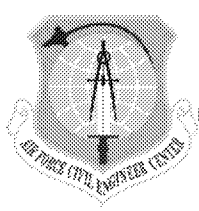




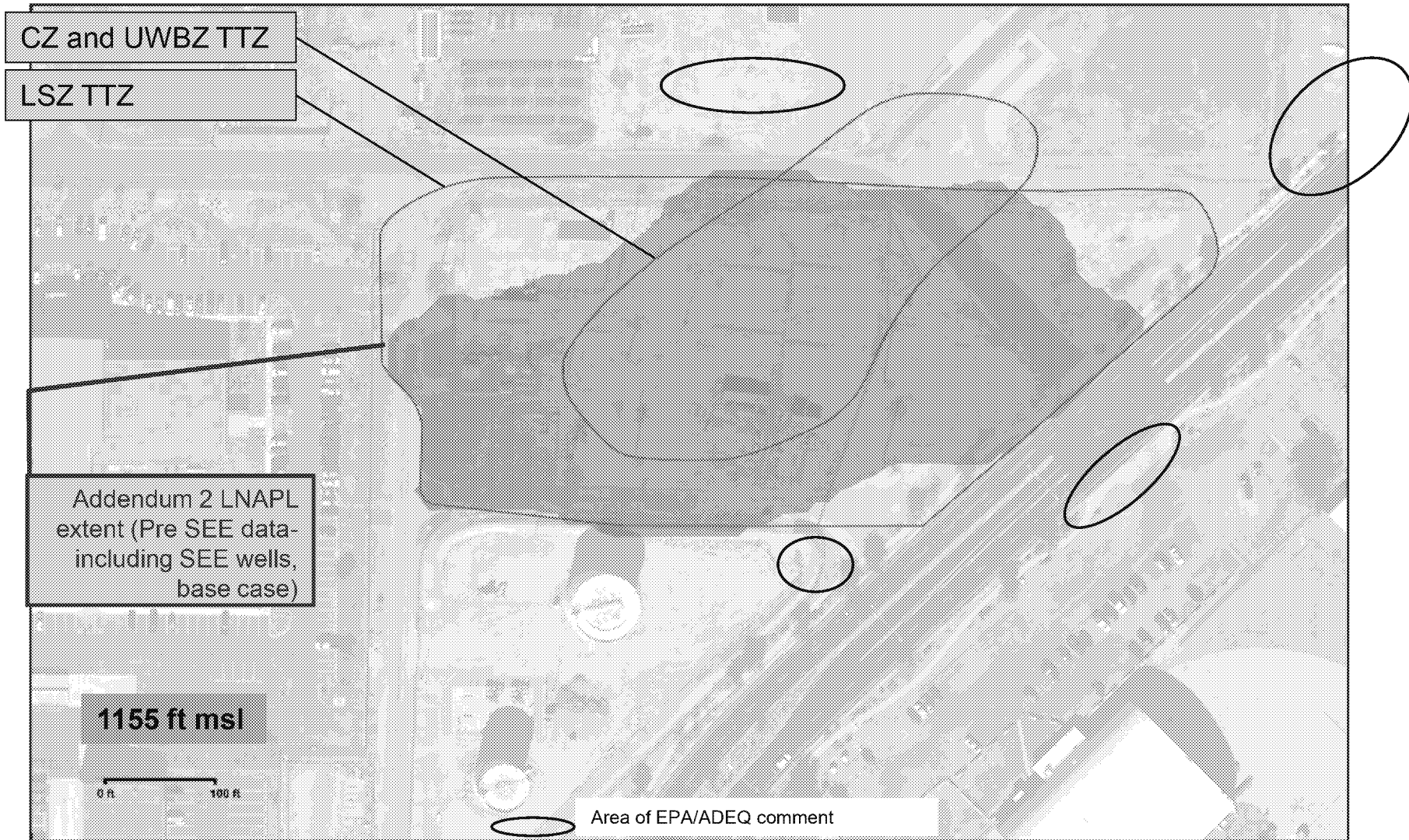
# LNAPL Revised Interpretation

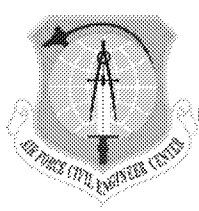
## Cobble Zone





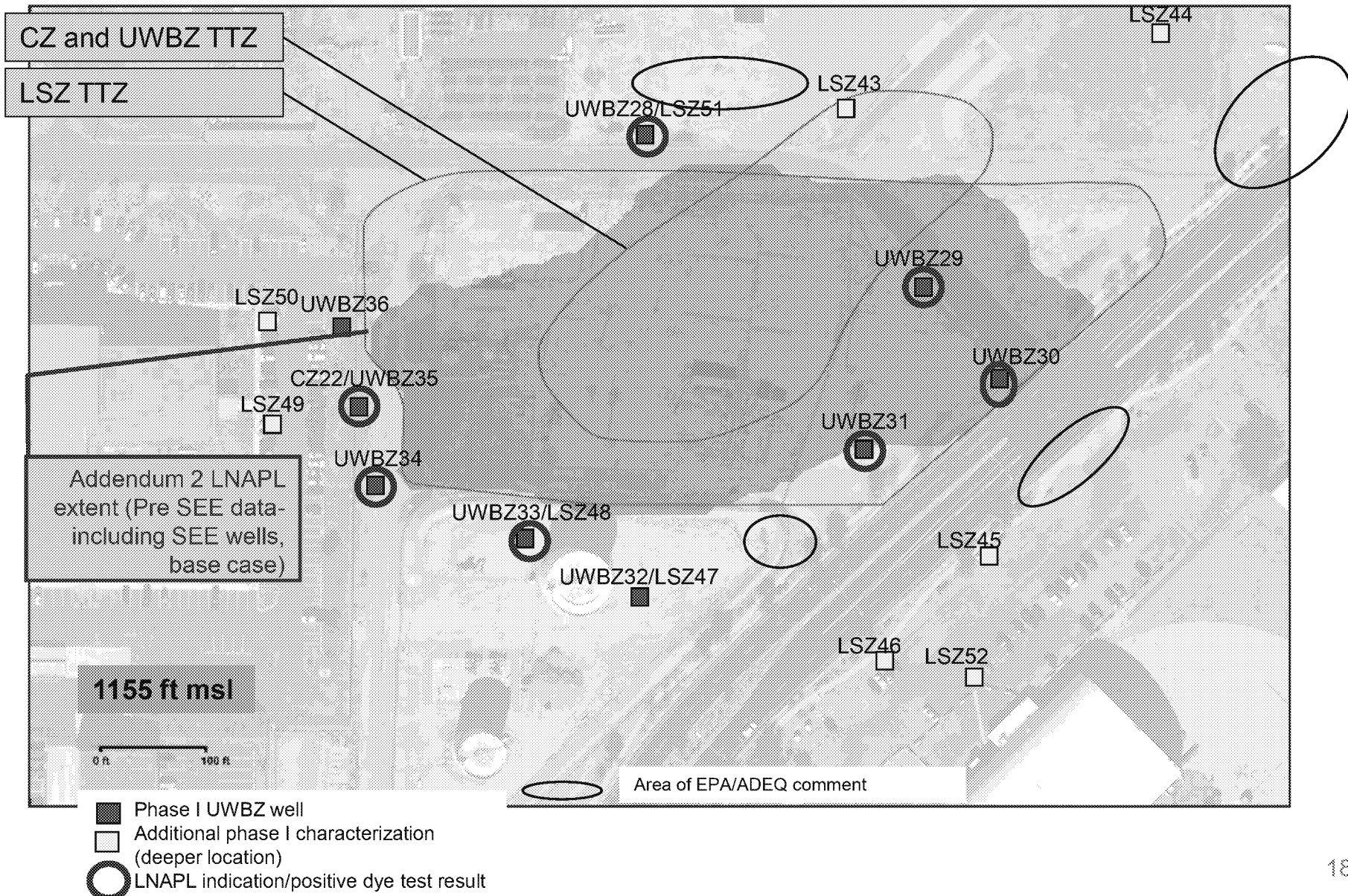
# Evaluation of UWBZ LNAPL Characterization Based on Pre SEE Data

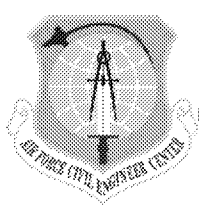




# Evaluation of UWBZ LNAPL Characterization

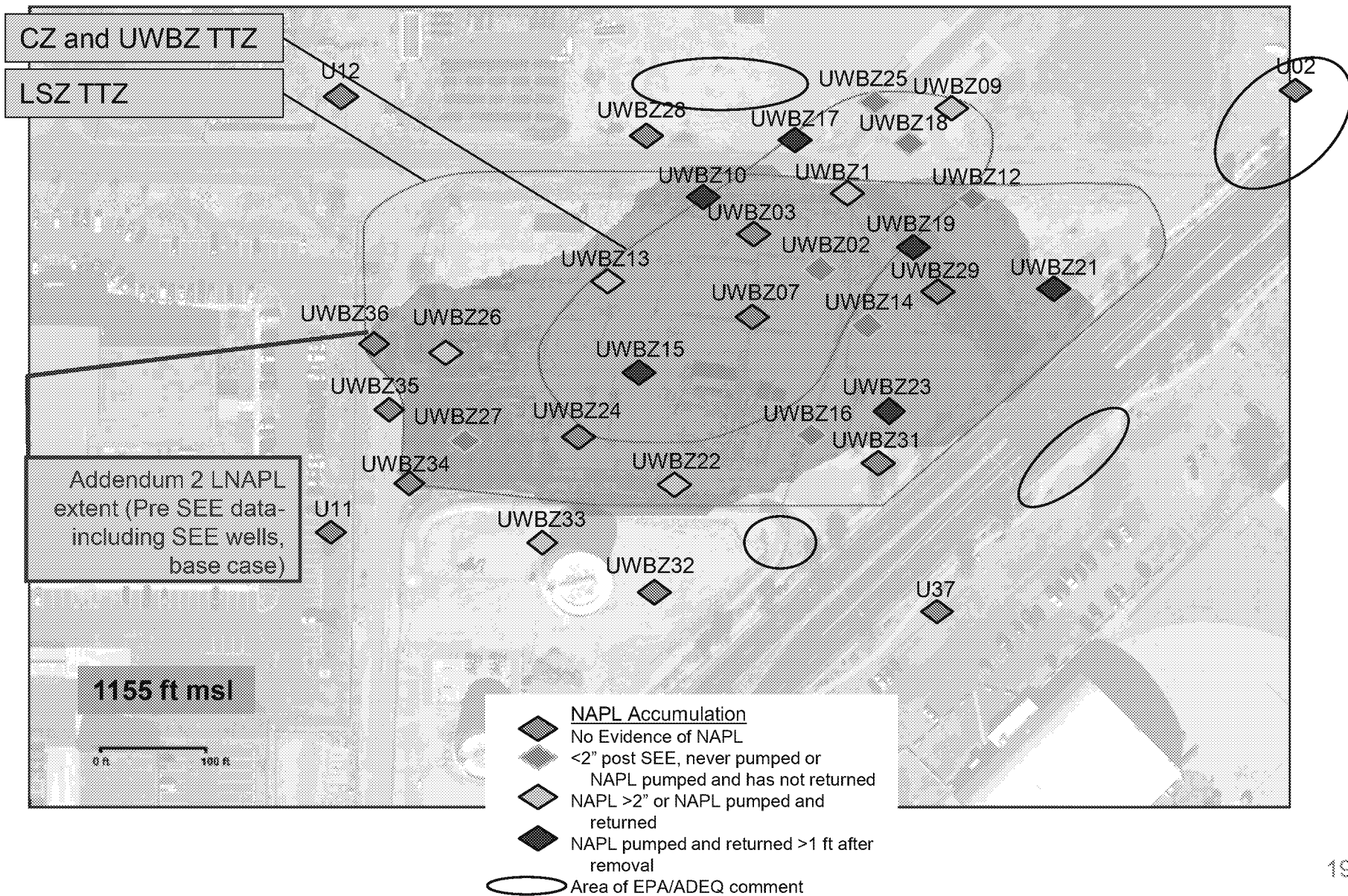
## LNAPL Indications/Dye Test

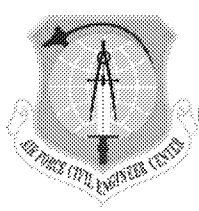




# Evaluation of UWBZ LNAPL Characterization

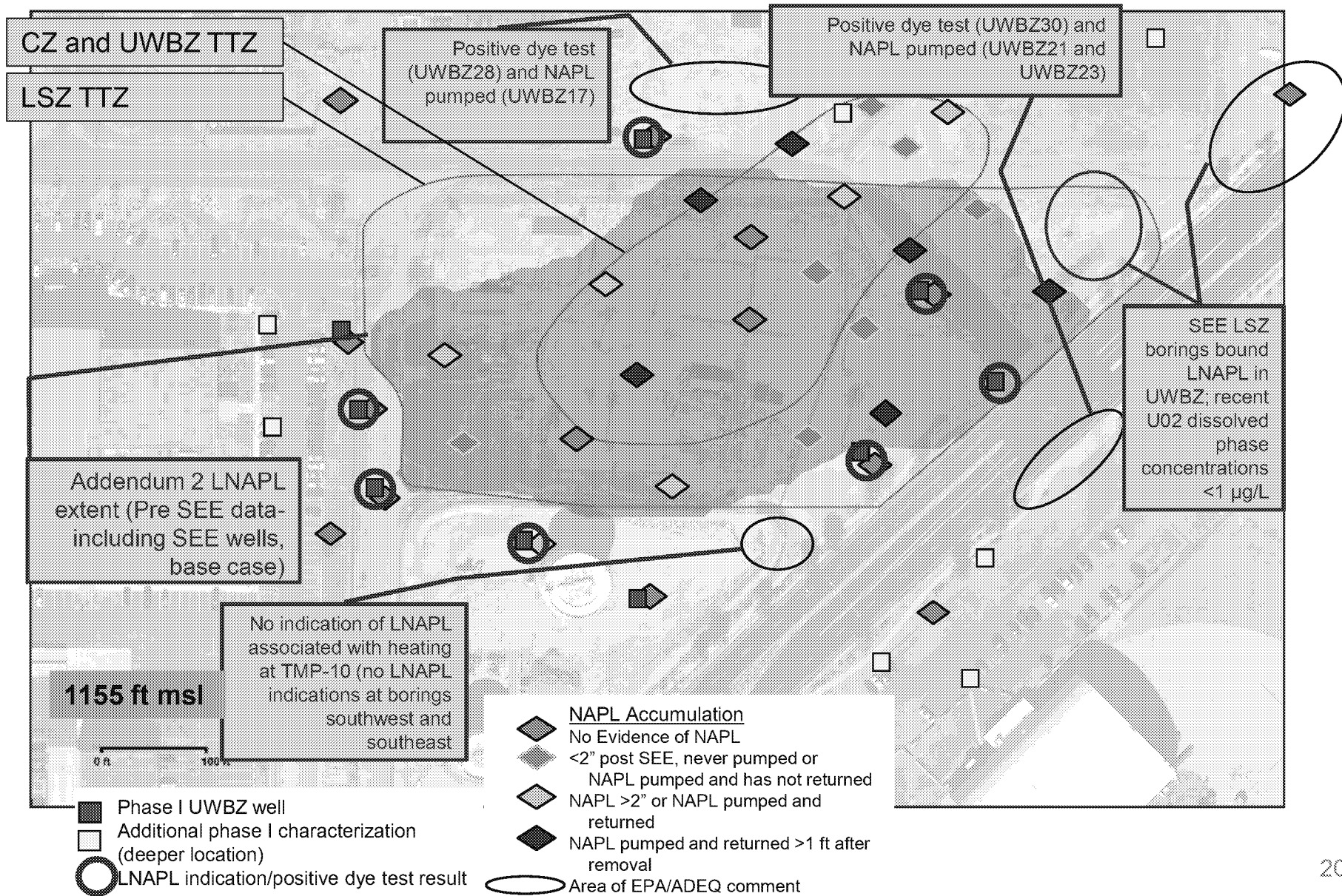
## Post SEE LNAPL Presence

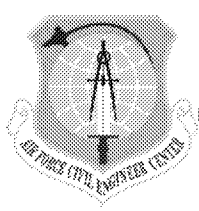




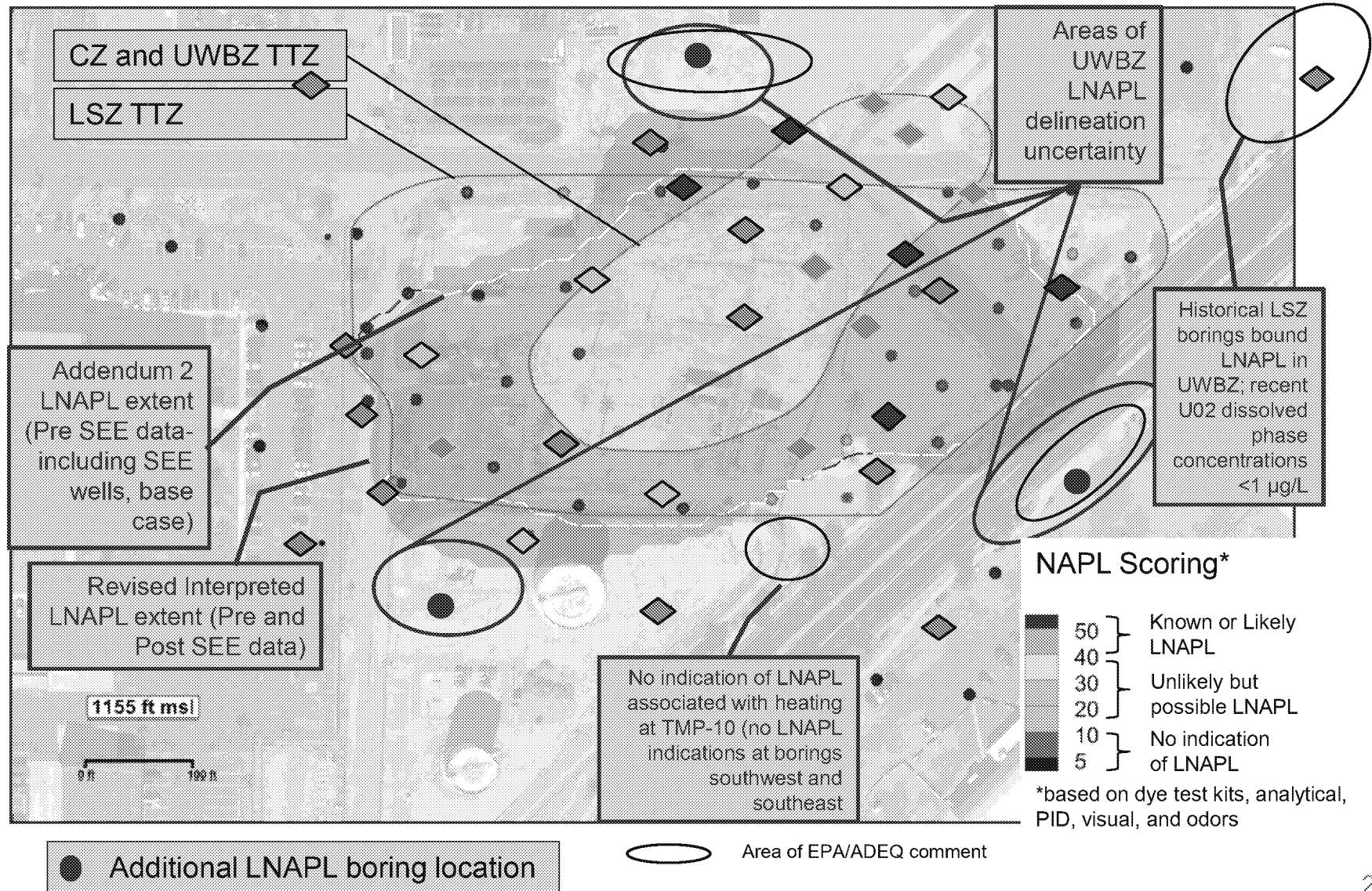
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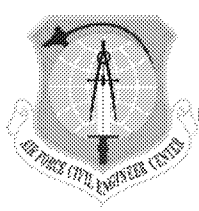
## Summary of Phase 1 LNAPL Data



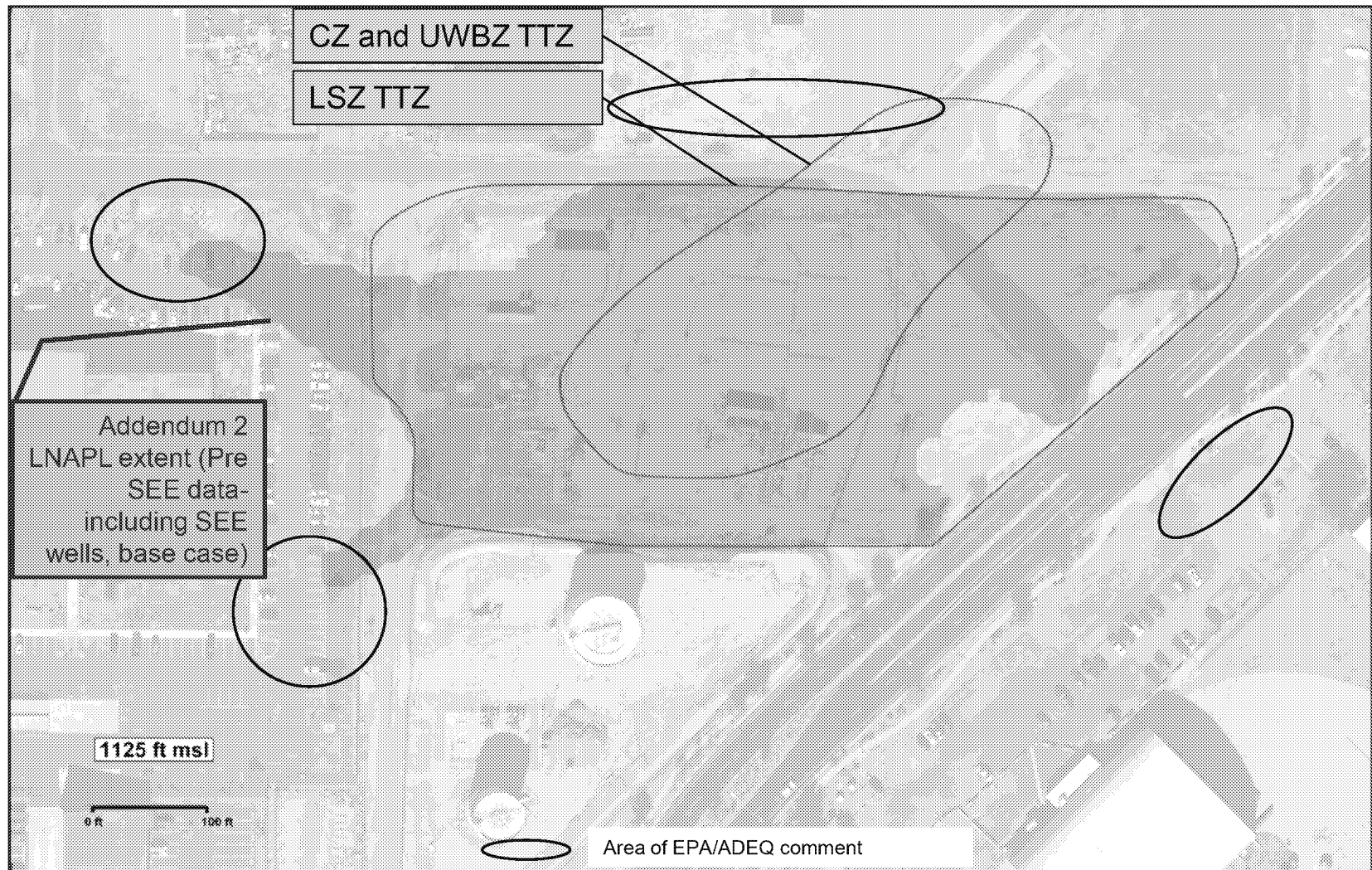


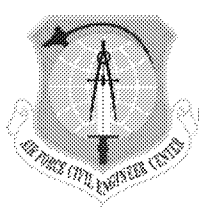
# LNAPL Revised Interpretation Upper Water Bearing Zone





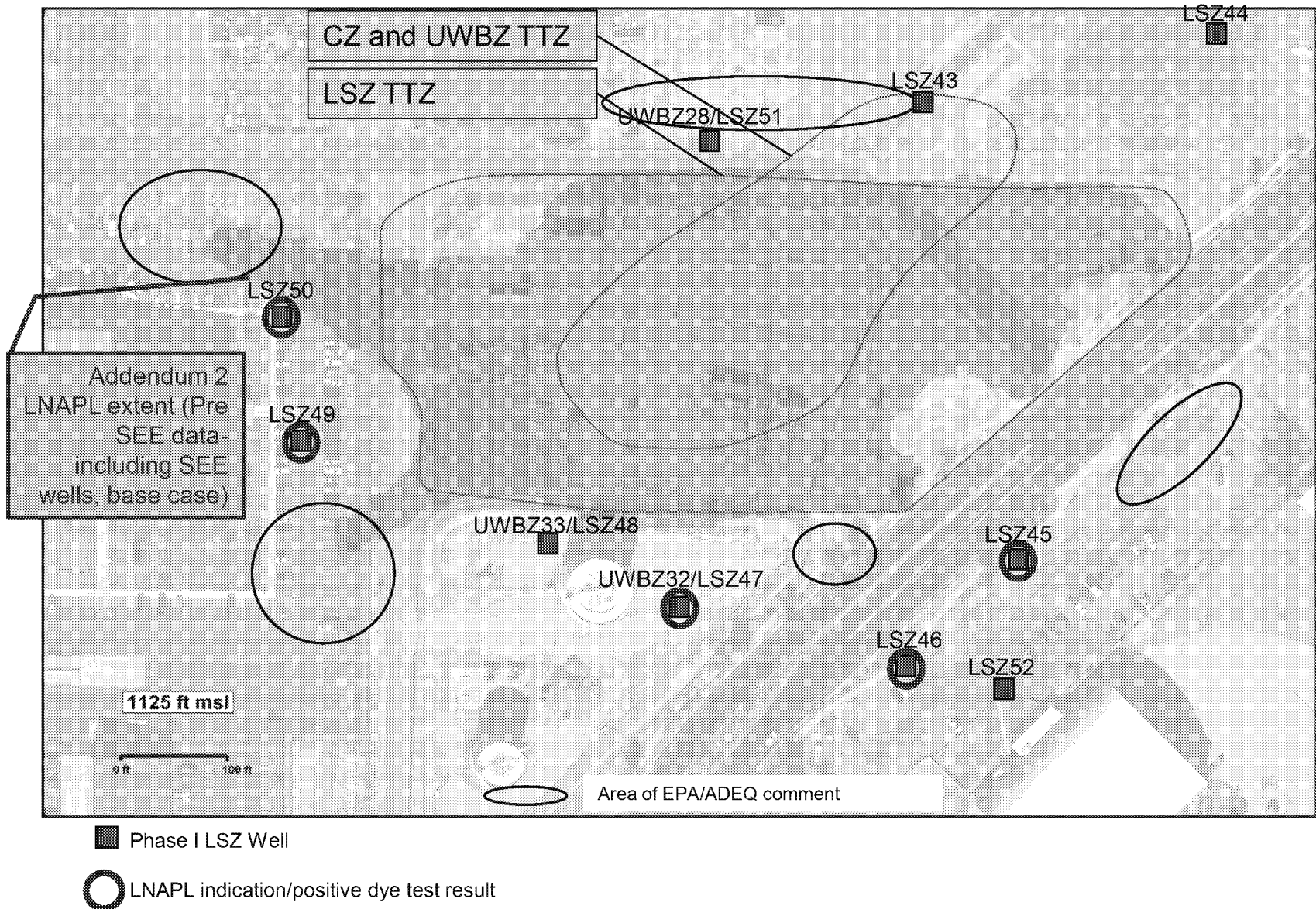
# Evaluation of LSZ LNAPL Characterization Based on Pre SEE Data



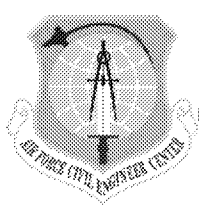


# Evaluation of LSZ LNAPL Characterization

## LNAPL Indications/Dye Test

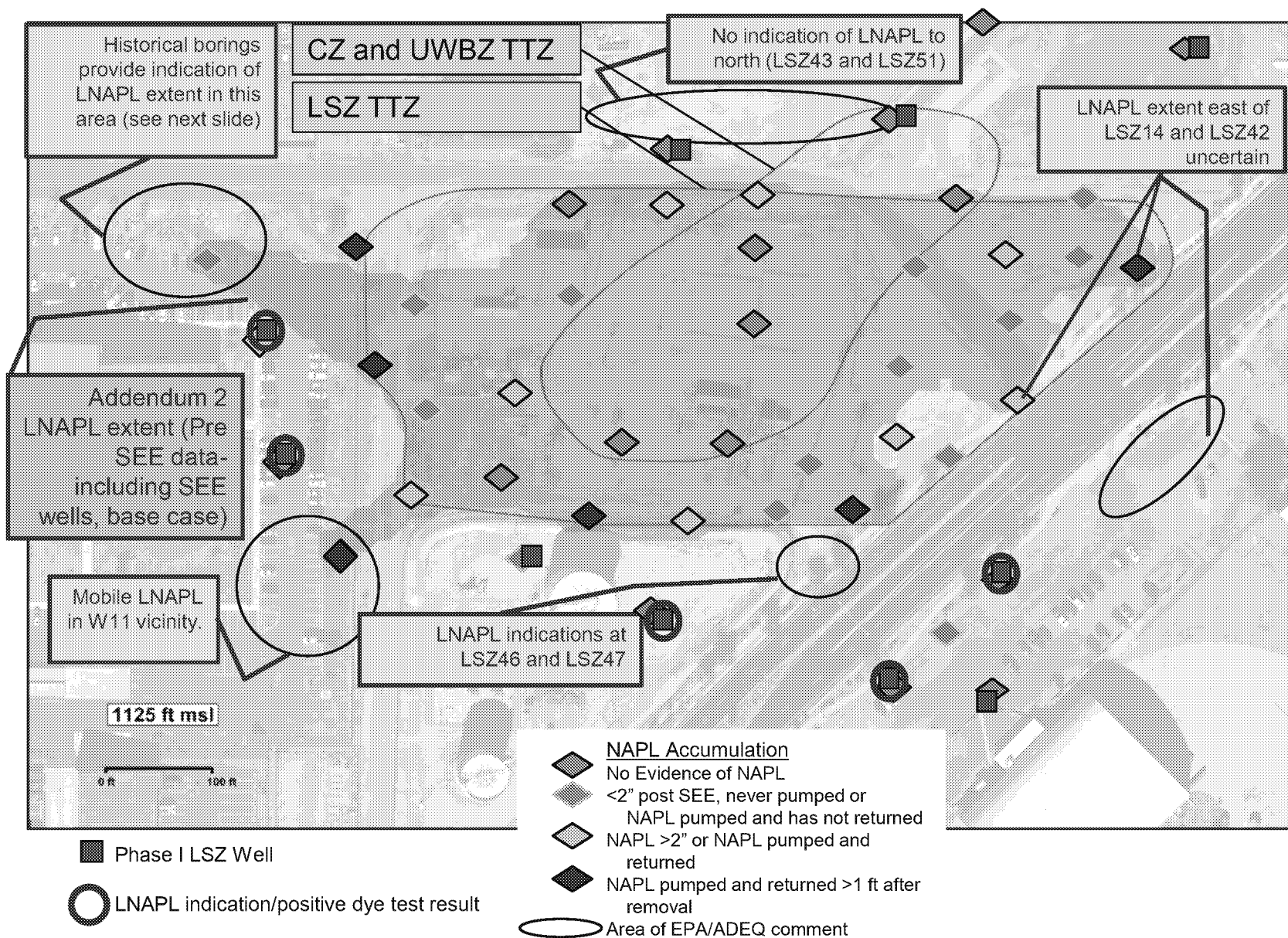


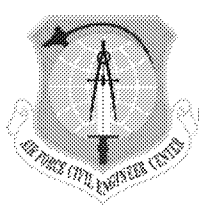




# Evaluation of LSZ LNAPL Characterization

## Summary of Phase 1 LNAPL Data

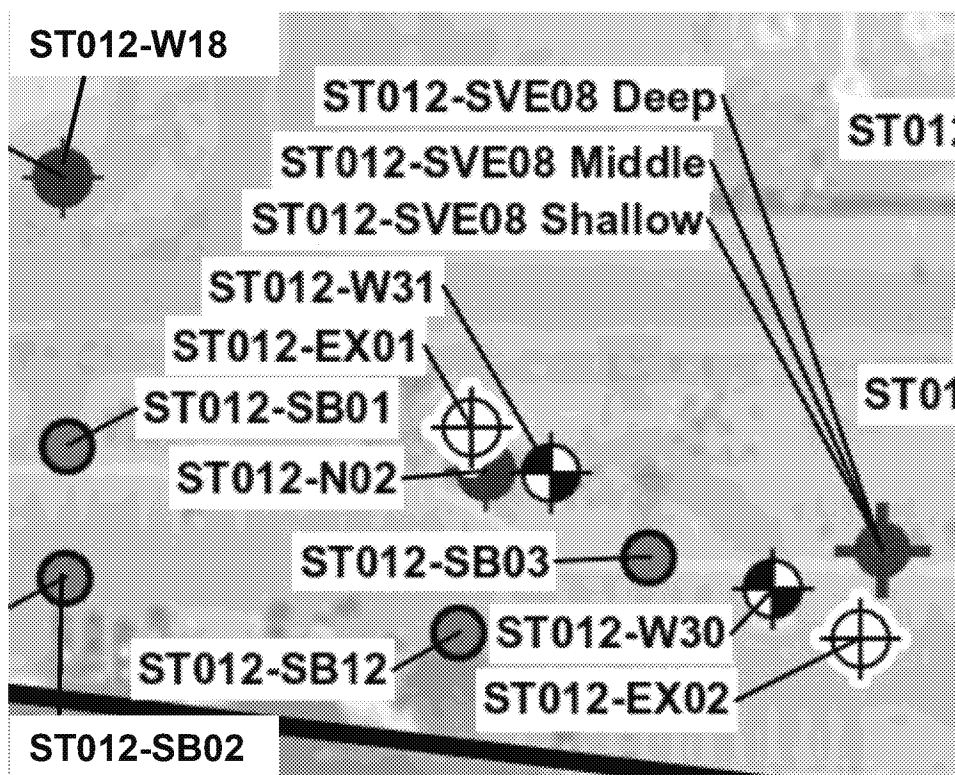




# Evaluation of LNAPL Characterization

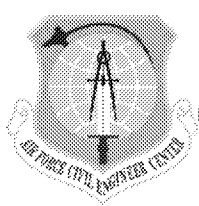
## W-30 Area

### W-30 Area (Historical Borings)



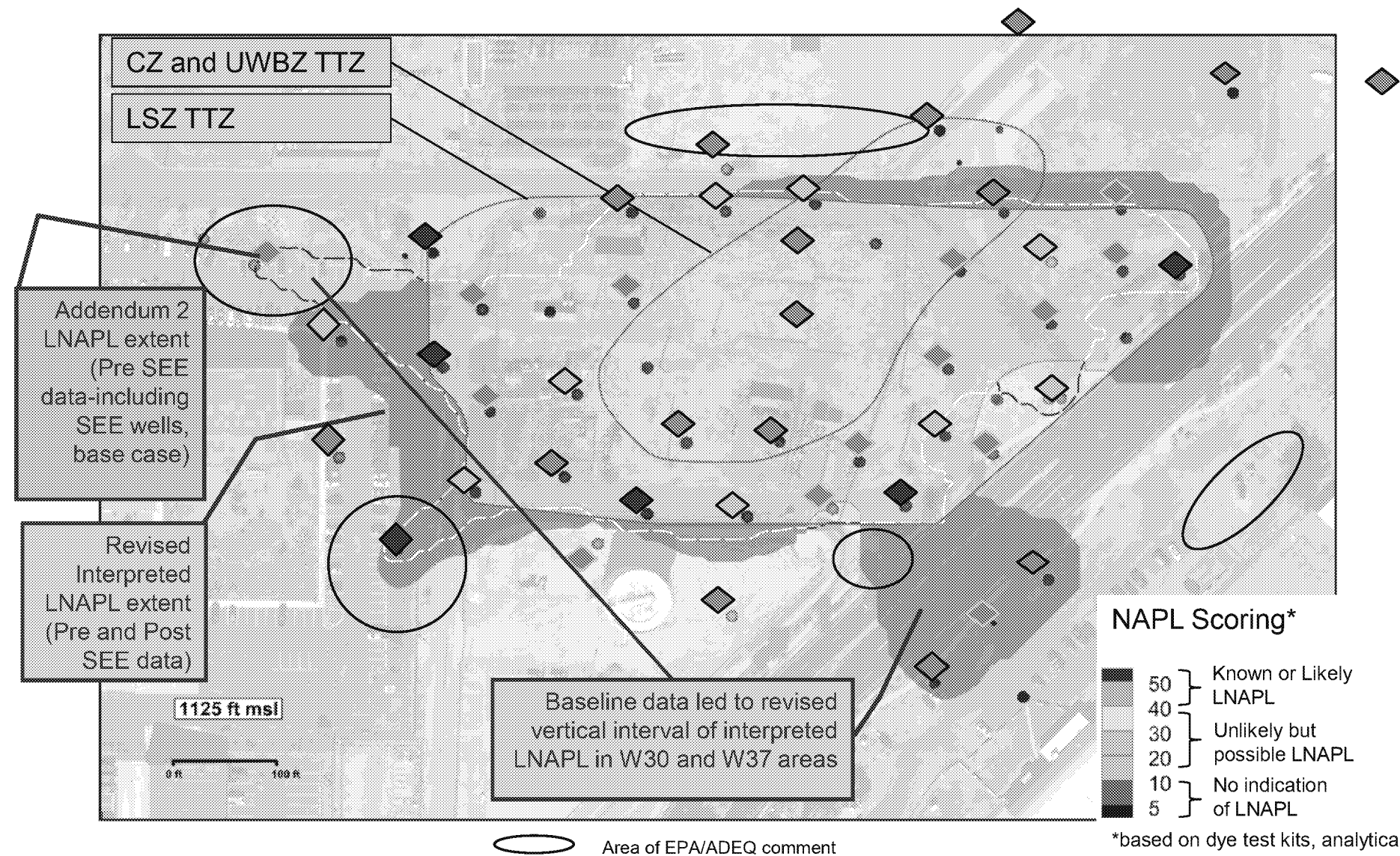
- SB01
  - No indication of NAPL to 220 ft bgs
  - Odor and 29 mg/kg TPH at 220 ft bgs
- SB02
  - No indication of NAPL to 220 ft bgs
  - 17 mg/kg TPH at 220 ft bgs
- SB03
  - Likely NAPL at 215 to 220 ft bgs
  - Odor, benzene 20 mg/kg, TPH 3,200 mg/kg
- SB12
  - Possible NAPL at 212 to 217 ft bgs
  - Visible staining, odor, but soil analysis not available
- N02
  - Likely NAPL at 216 to 222 ft bgs
  - Strong odors, PID >1,000 ppm
- W18
  - Boring log not available
- W31
  - Boring log not available

**LNAPL extent extends west past SB12 and N02 but is bounded by SB01 and SB02 locations.**

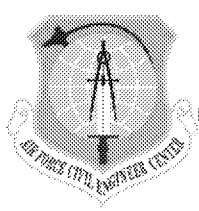


# LNAPL Revised Interpretation

## Lower Saturated Zone

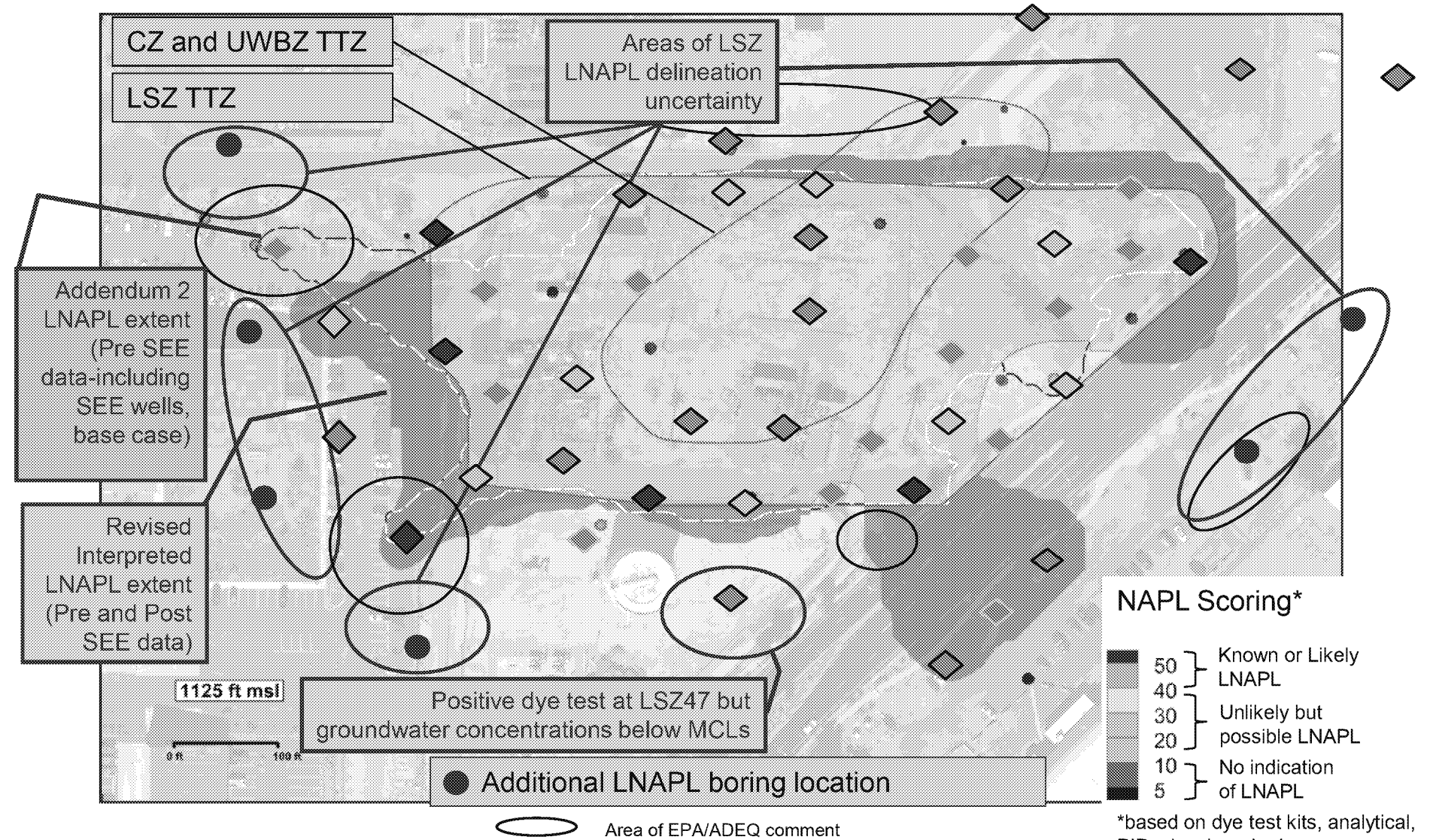


\*based on dye test kits, analytical, PID, visual, and odors

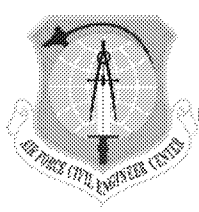


# LNAPL Revised Interpretation

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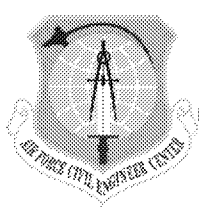
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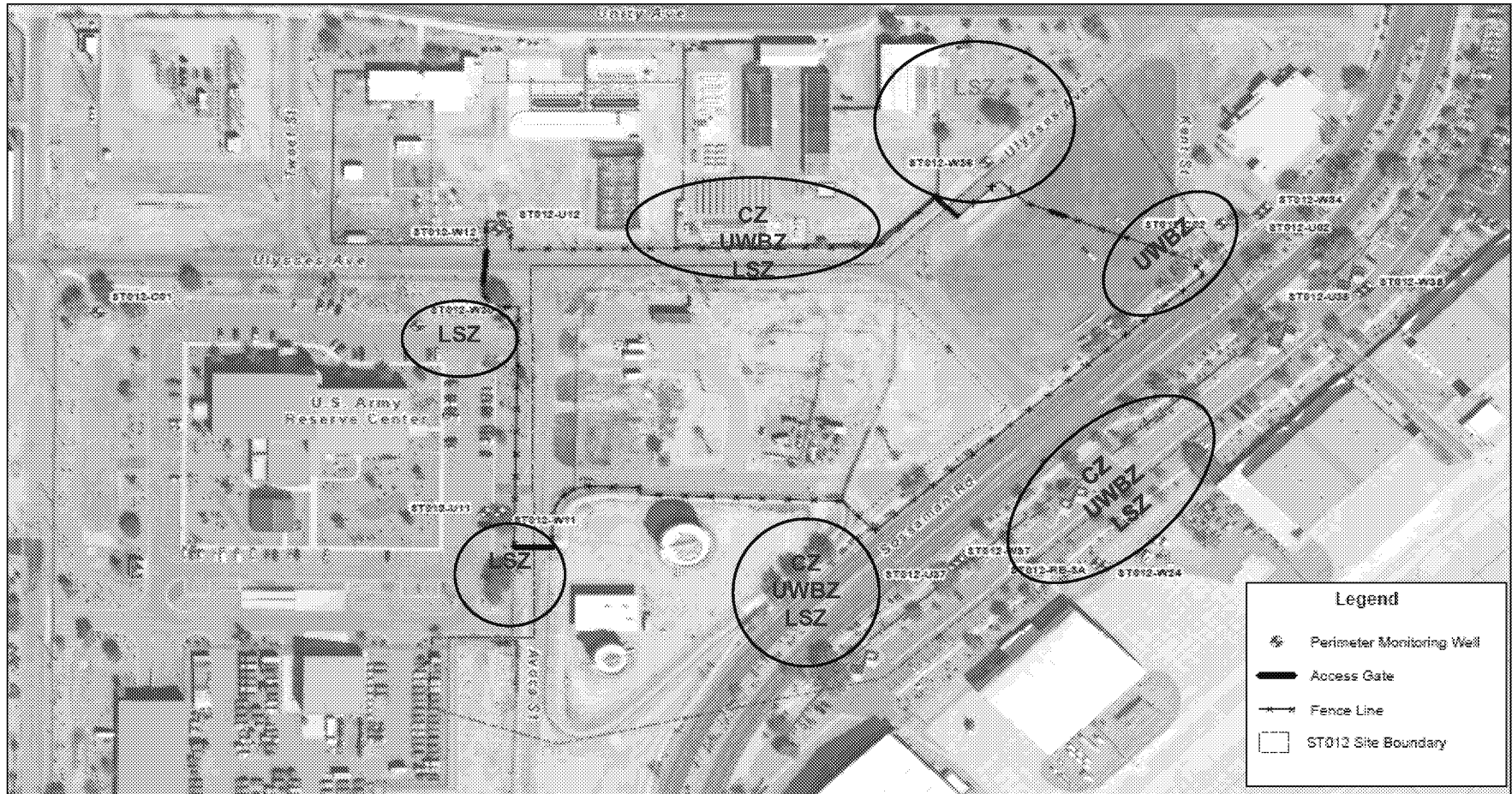
# Site ST012 Groundwater Characterization

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- **Groundwater Characterization**
  - Evaluate EBR baseline and perimeter well groundwater data
  - Focus on dissolved phase concentrations of COCs
    - Benzene
    - BTEX+naphthalene



# Site ST012 EPA/ADEQ Concerns for LNAPL and Groundwater (Benzene) Characterization



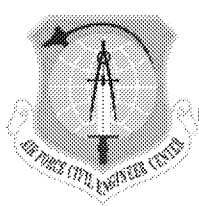
Red – LNAPL and dissolved phase

Green – dissolved phase

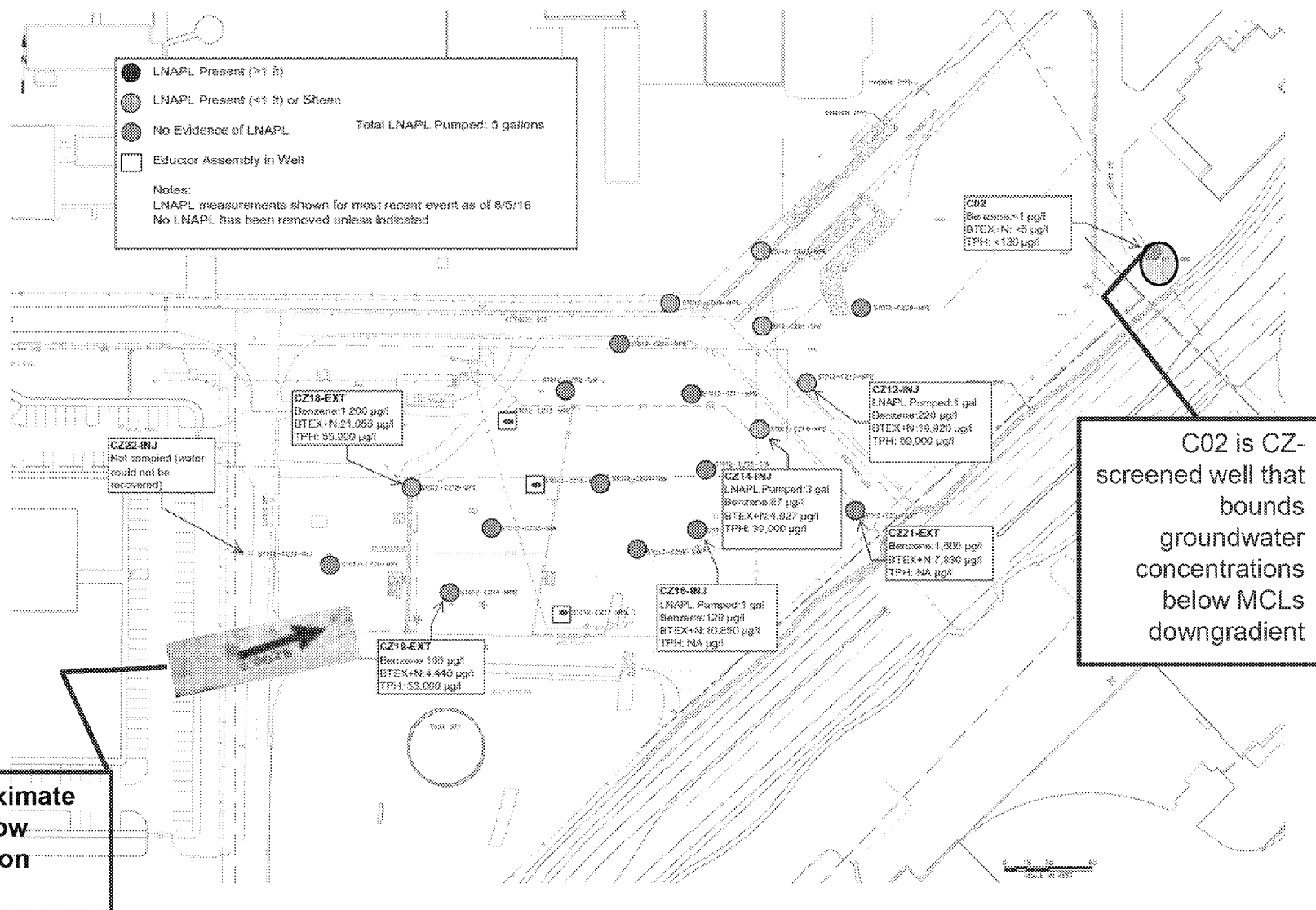
Blue – LNAPL

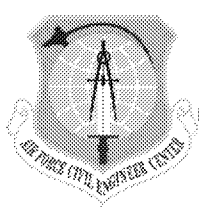


Area of EPA/ADEQ comment

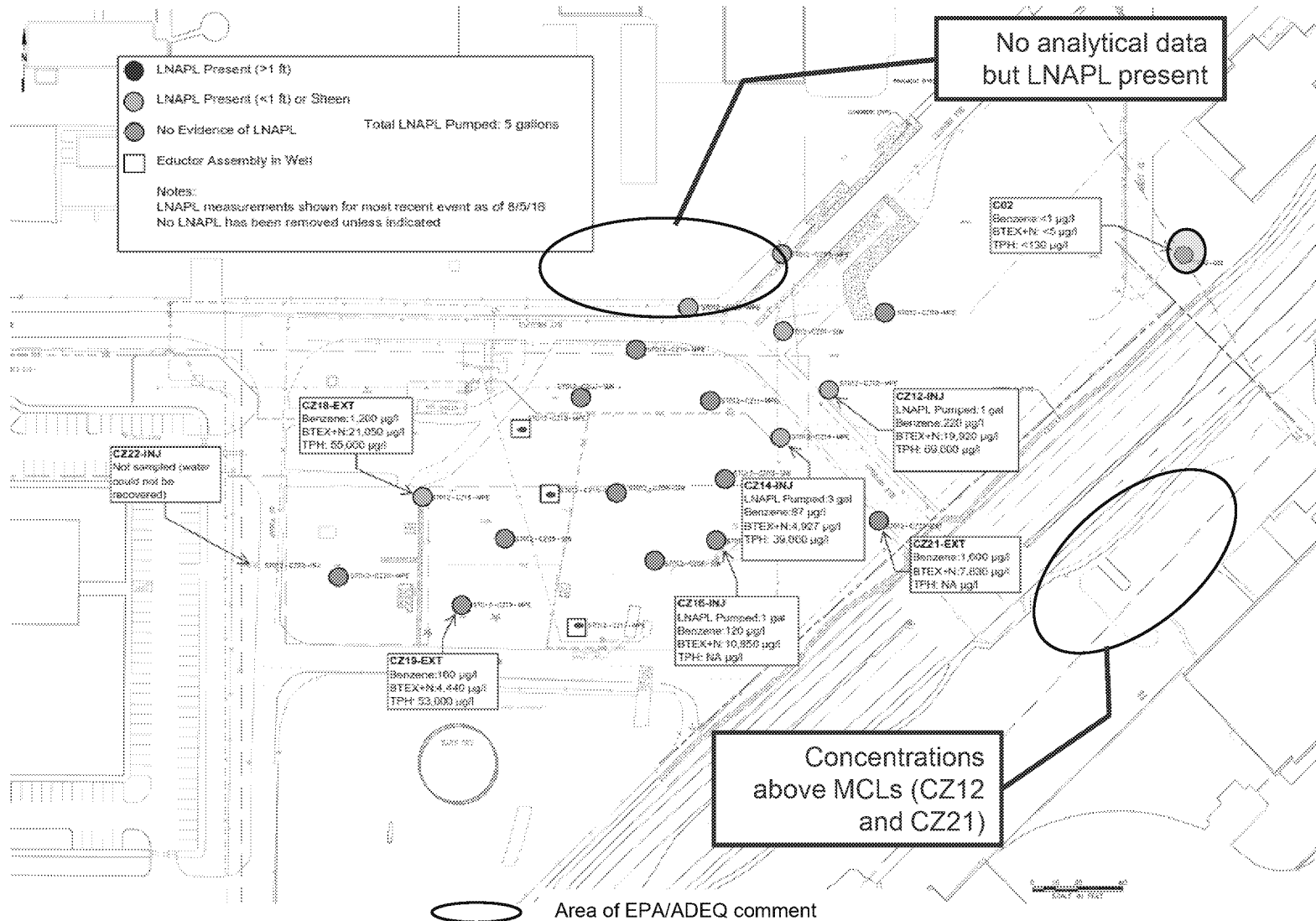


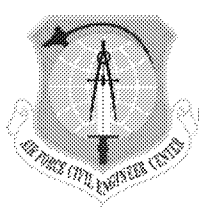
# Site ST012 CZ Dissolved Phase Concentrations



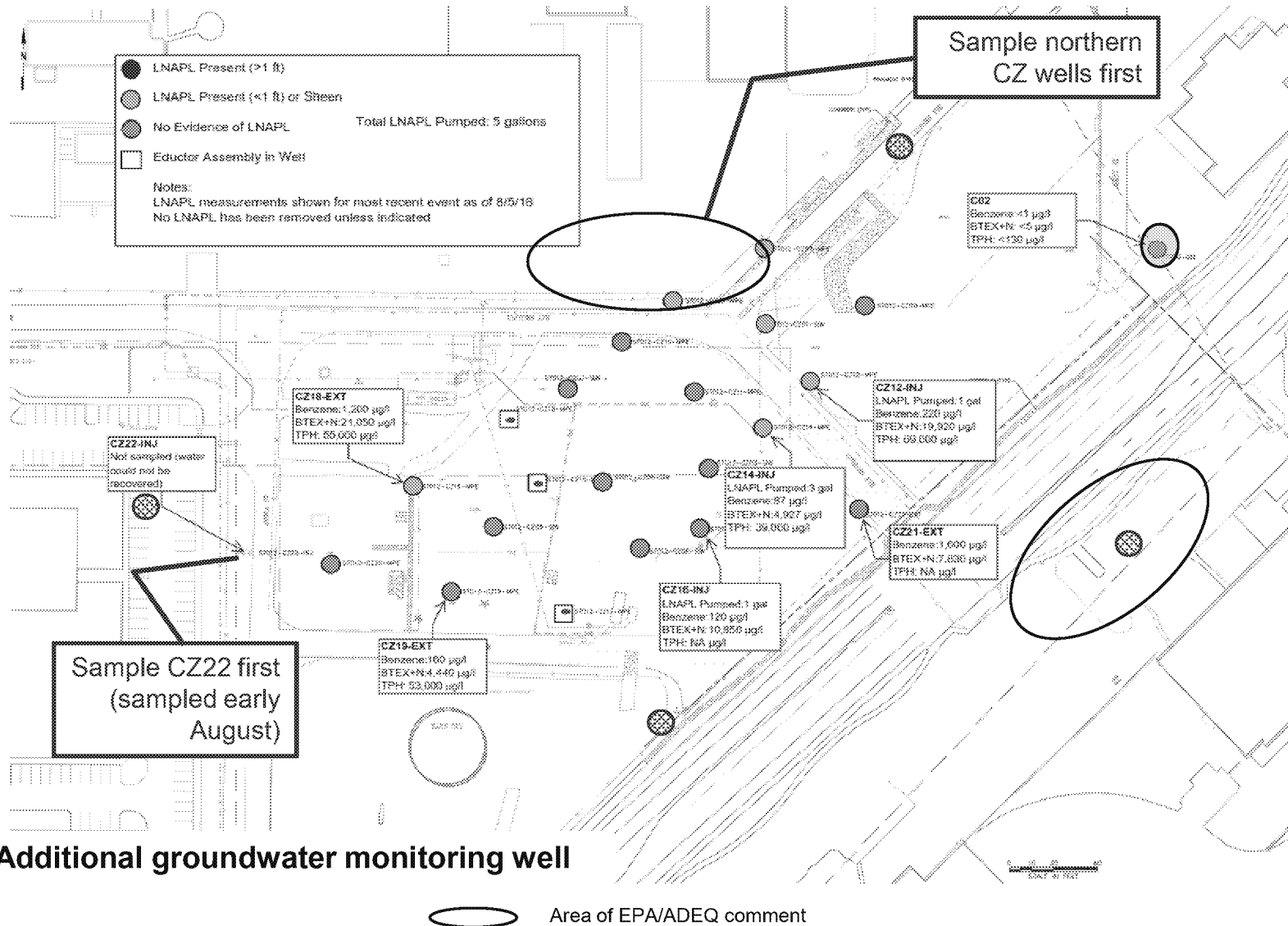


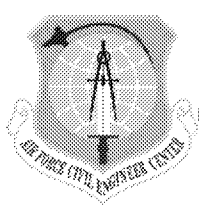
# Site ST012 CZ Evaluation of EPA/ADEQ Concerns



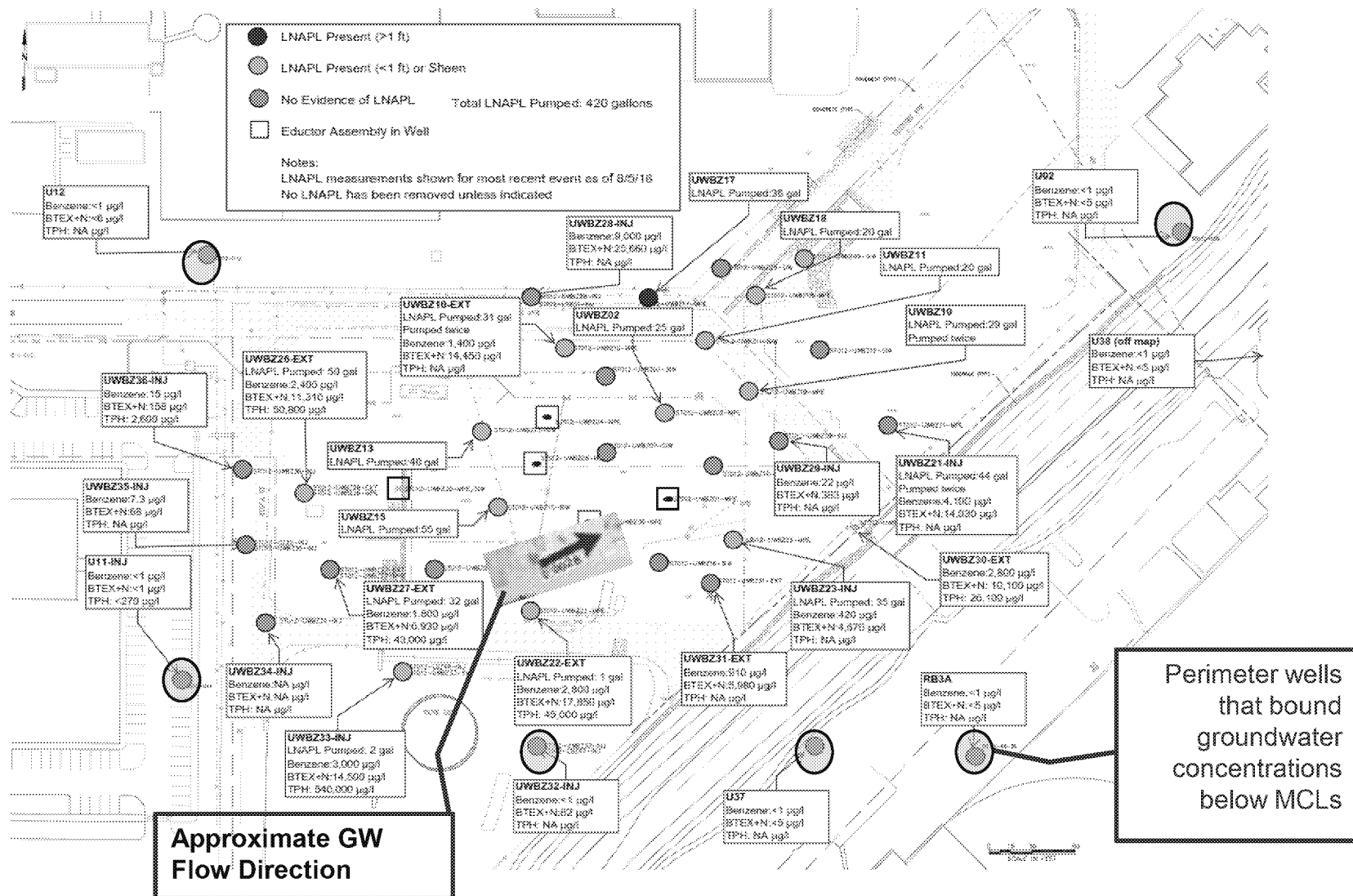


# Site ST012 CZ Additional Characterization

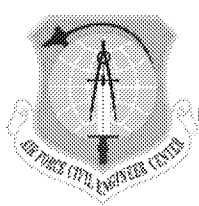




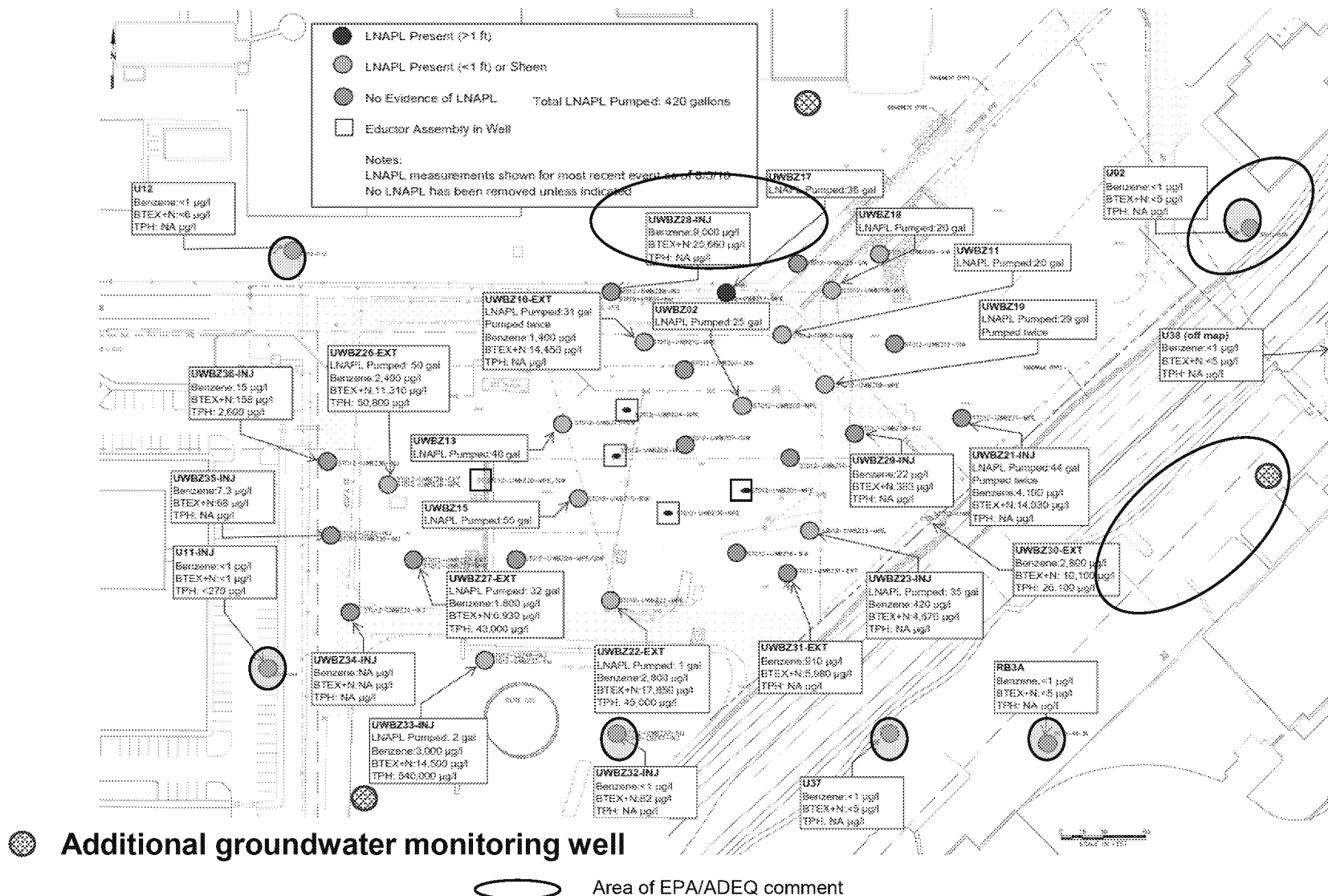
# Site ST012 UWBZ Dissolved Phase Concentrations

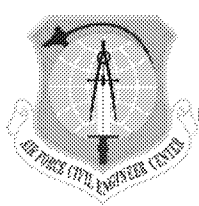




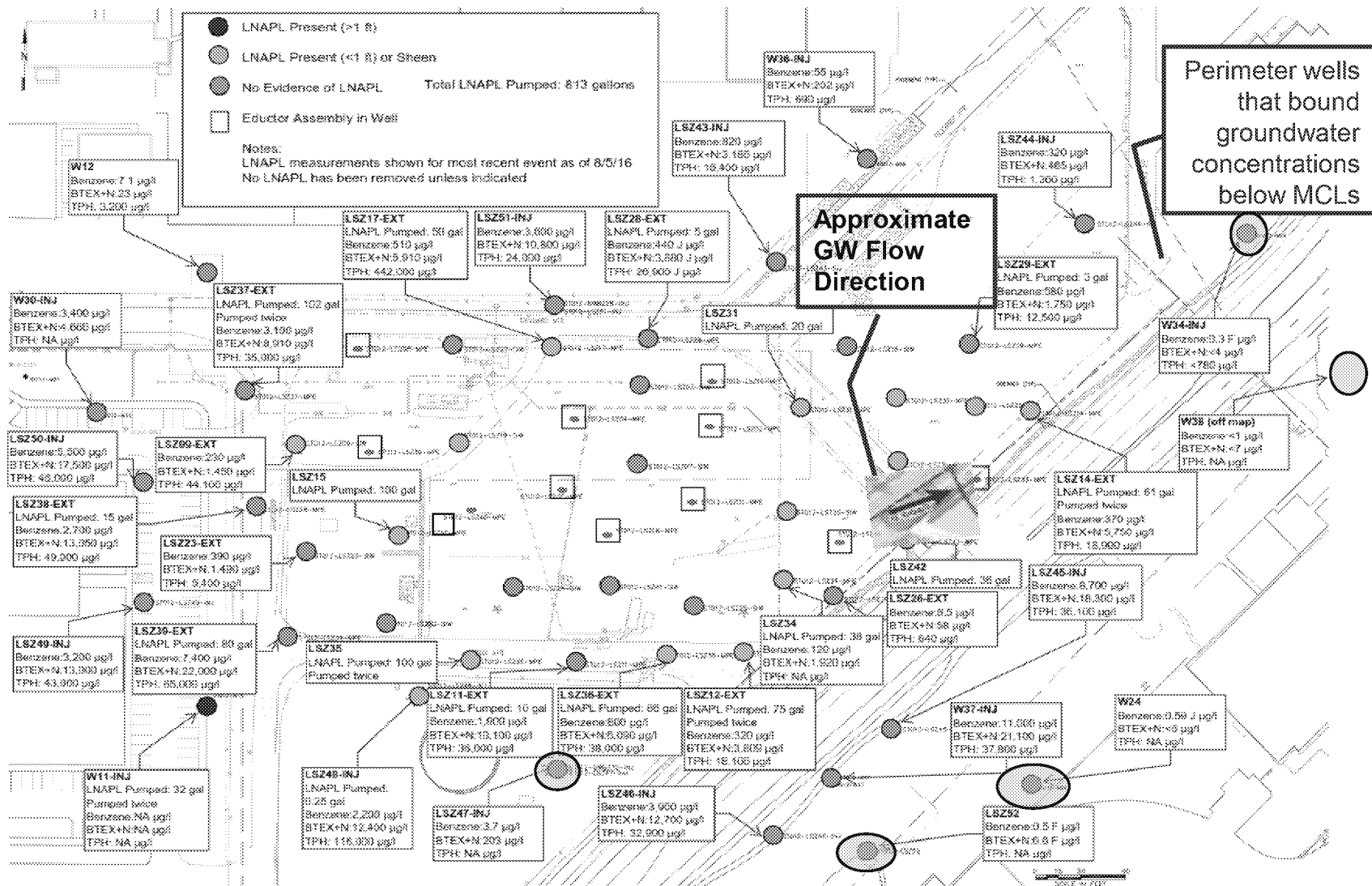


# Site ST012 UWBZ Additional Characterization

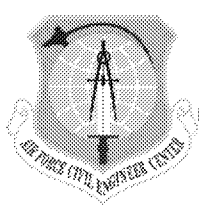




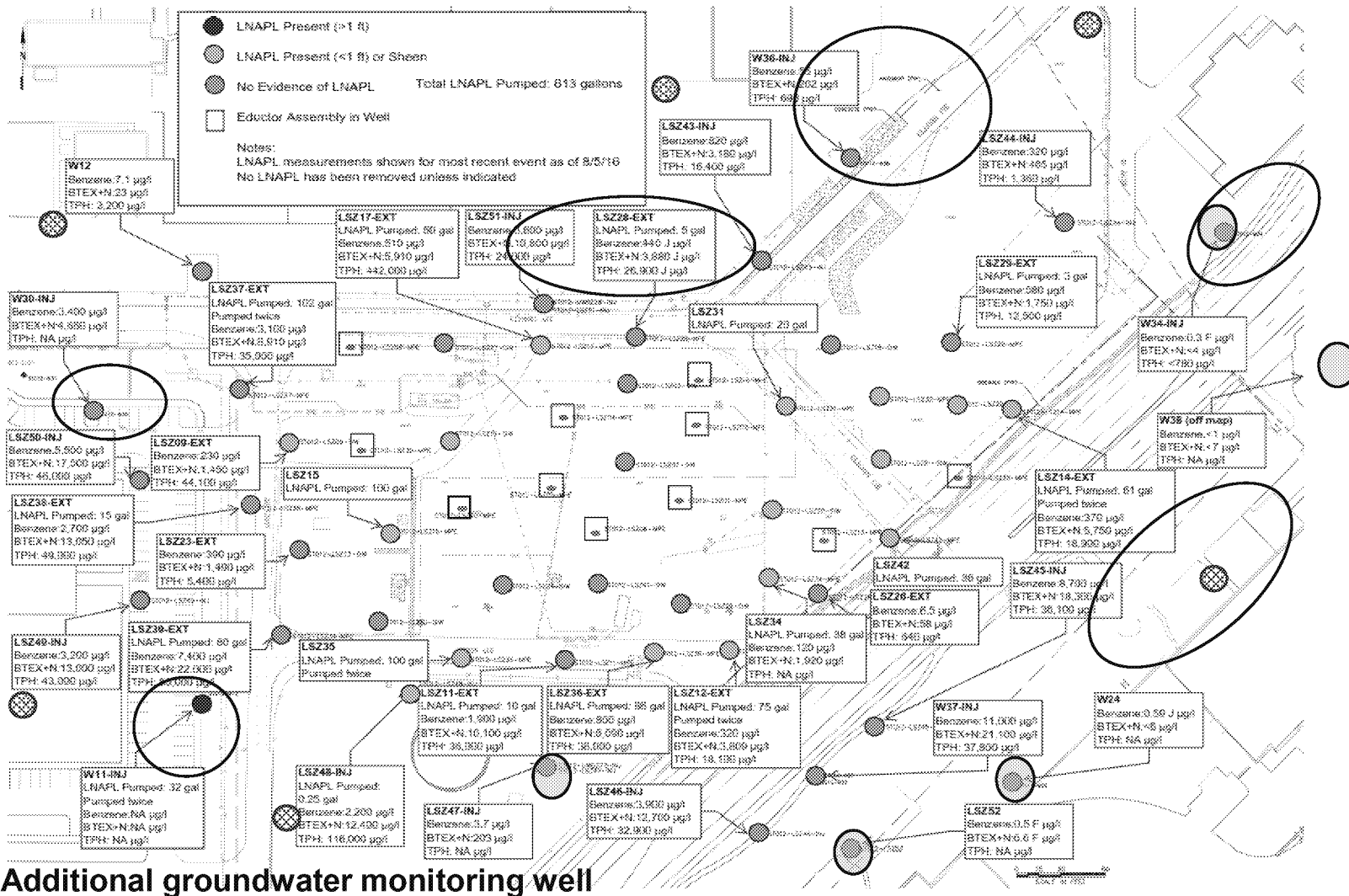
# Site ST012 LSZ Dissolved Phase Concentrations

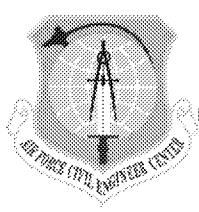






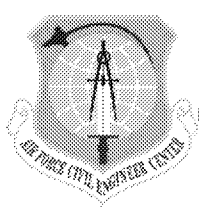
# Site ST012 LSZ Additional Characterization



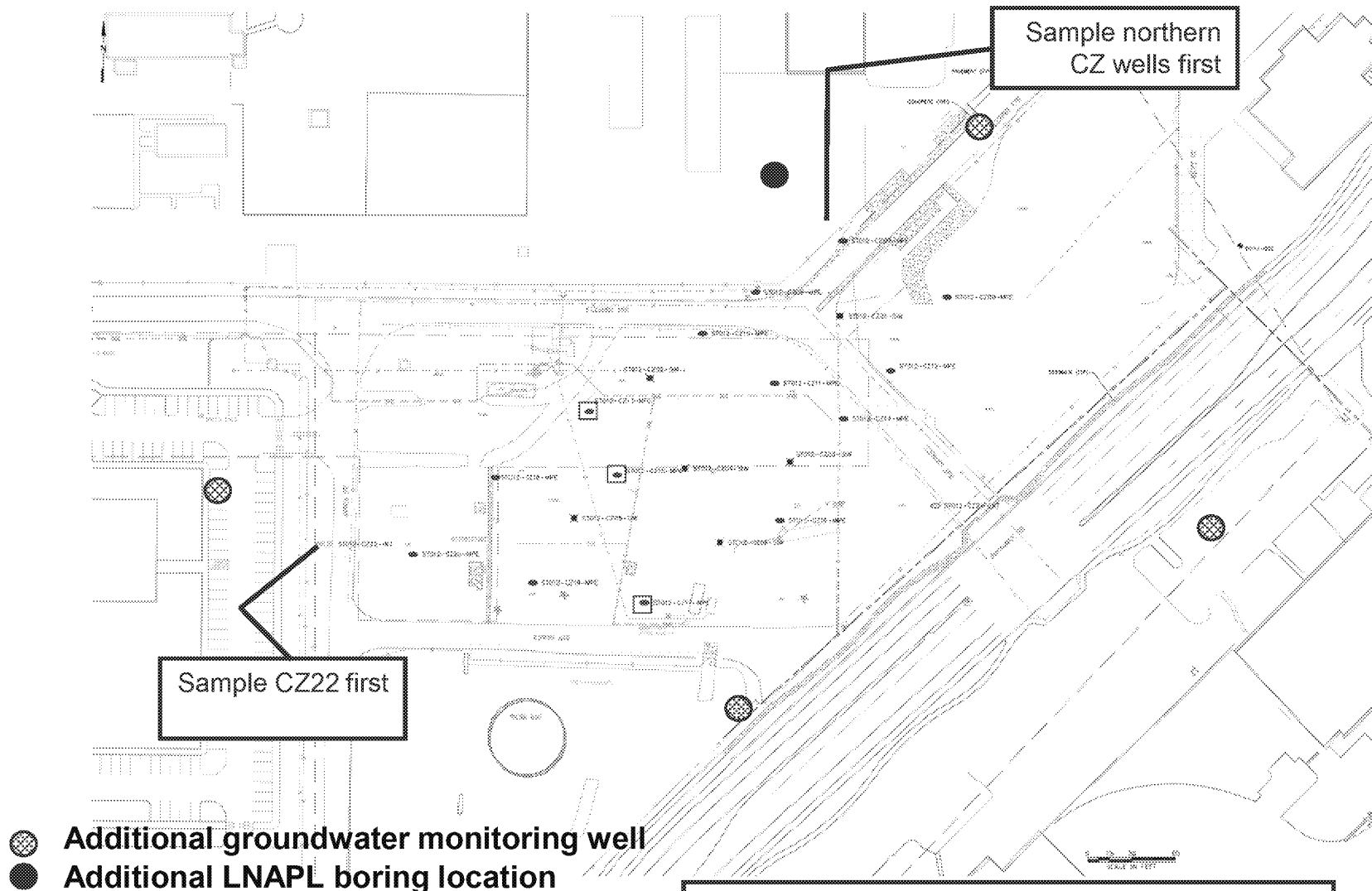


# **ST012**

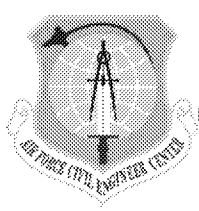
## **Summary of Additional Characterization**



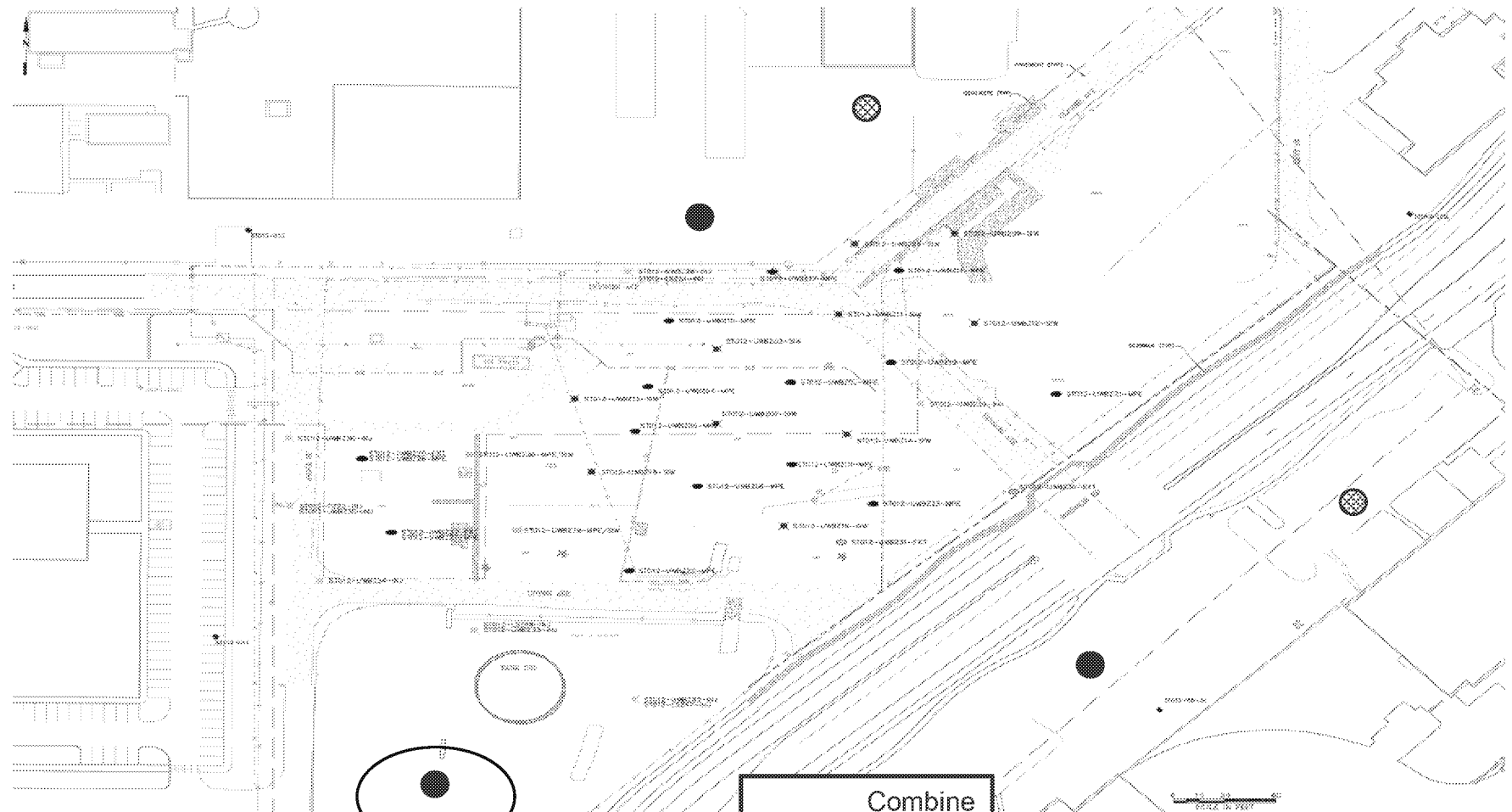
# Summary of Additional CZ Characterization



Some locations may also be combined across the vertical intervals (not shown)



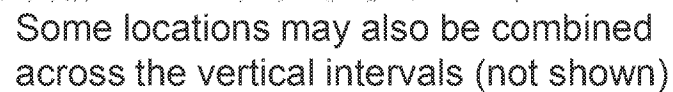
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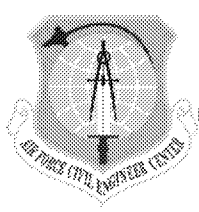


- Additional groundwater monitoring
- Additional LNAPL boring location

Combine  
Locations

Some locations may also be combined  
across the vertical intervals (not shown)

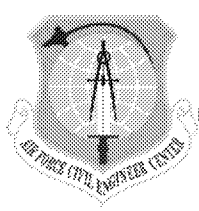




# **ST012**

# **Containment**

# **Evaluation**

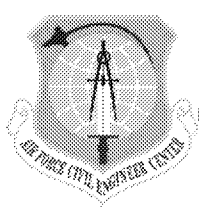


# **Site ST012 Containment Evaluation**

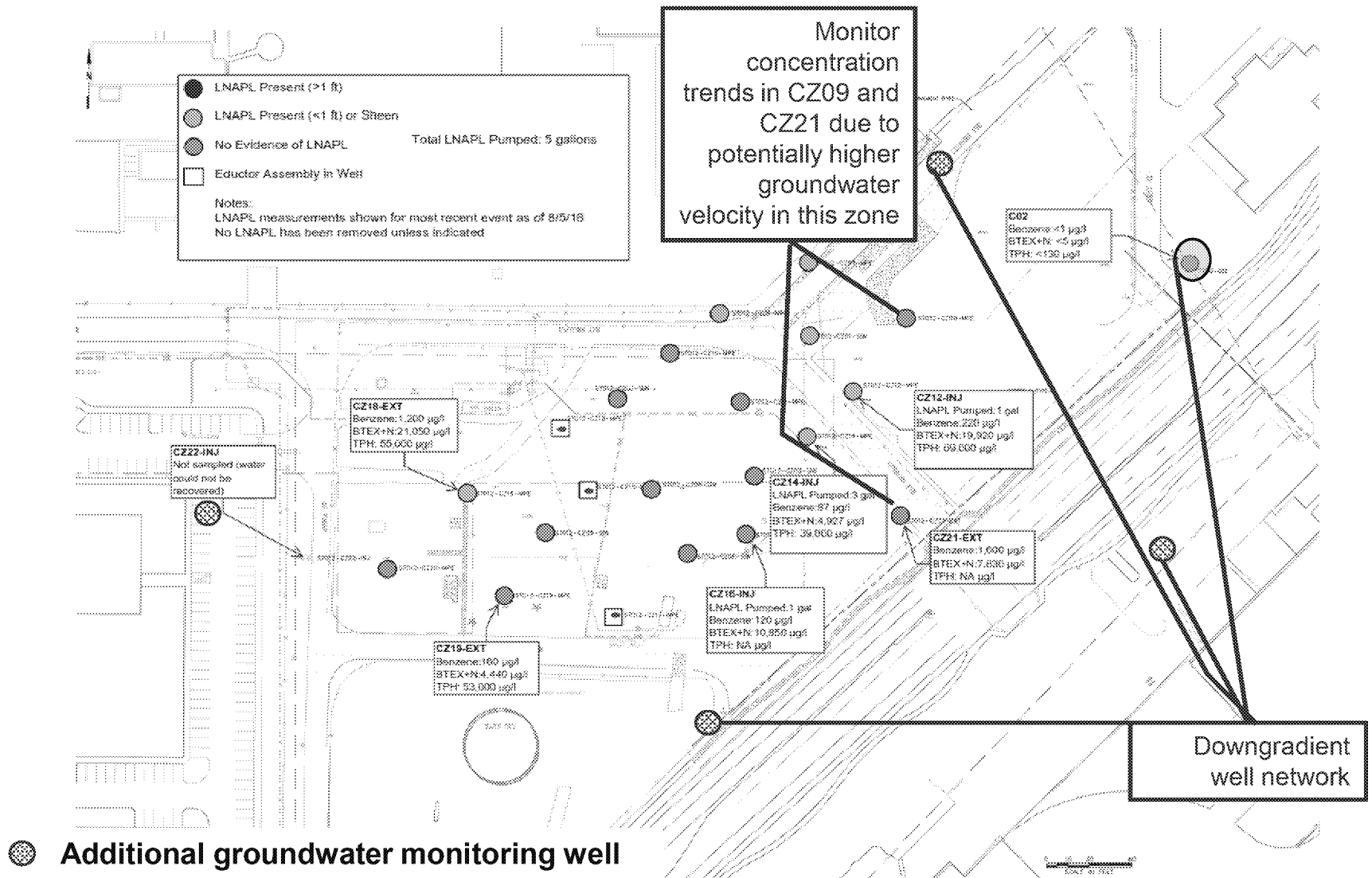
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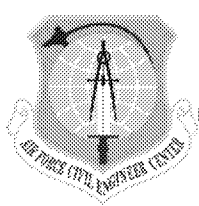
- **Containment**

- **Containment demonstration using a monitoring well network based on:**
  - **Petroleum plumes typically have limited migration (primarily following initial release)**
  - **The plume has been generally stable for many years**
  - **No evidence of significant migration**
- **Evaluated monitoring network considering existing plus additional characterization wells**

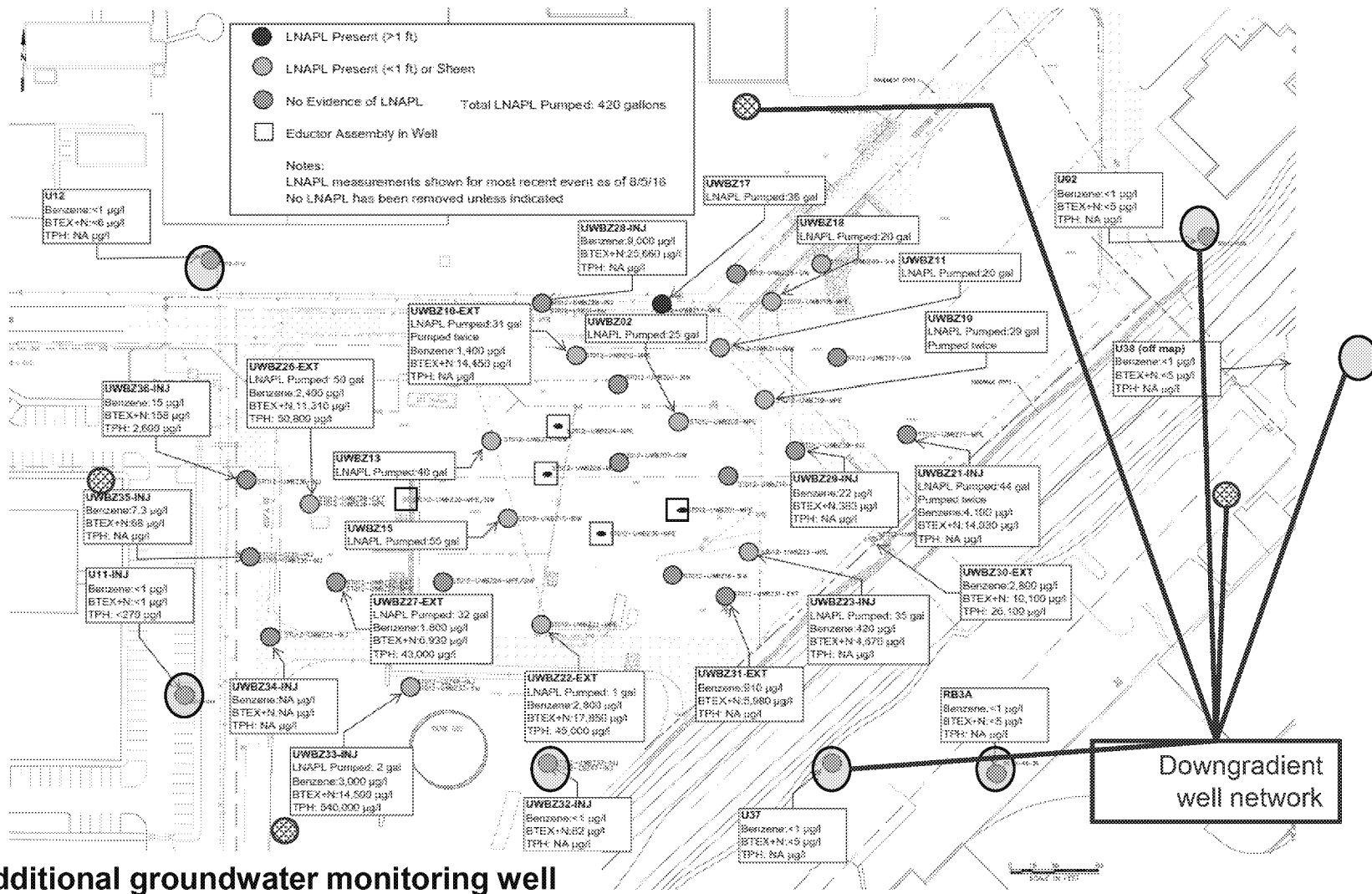


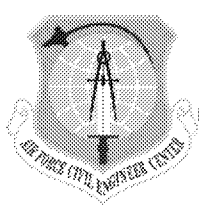
# Site ST012 CZ Containment Monitoring



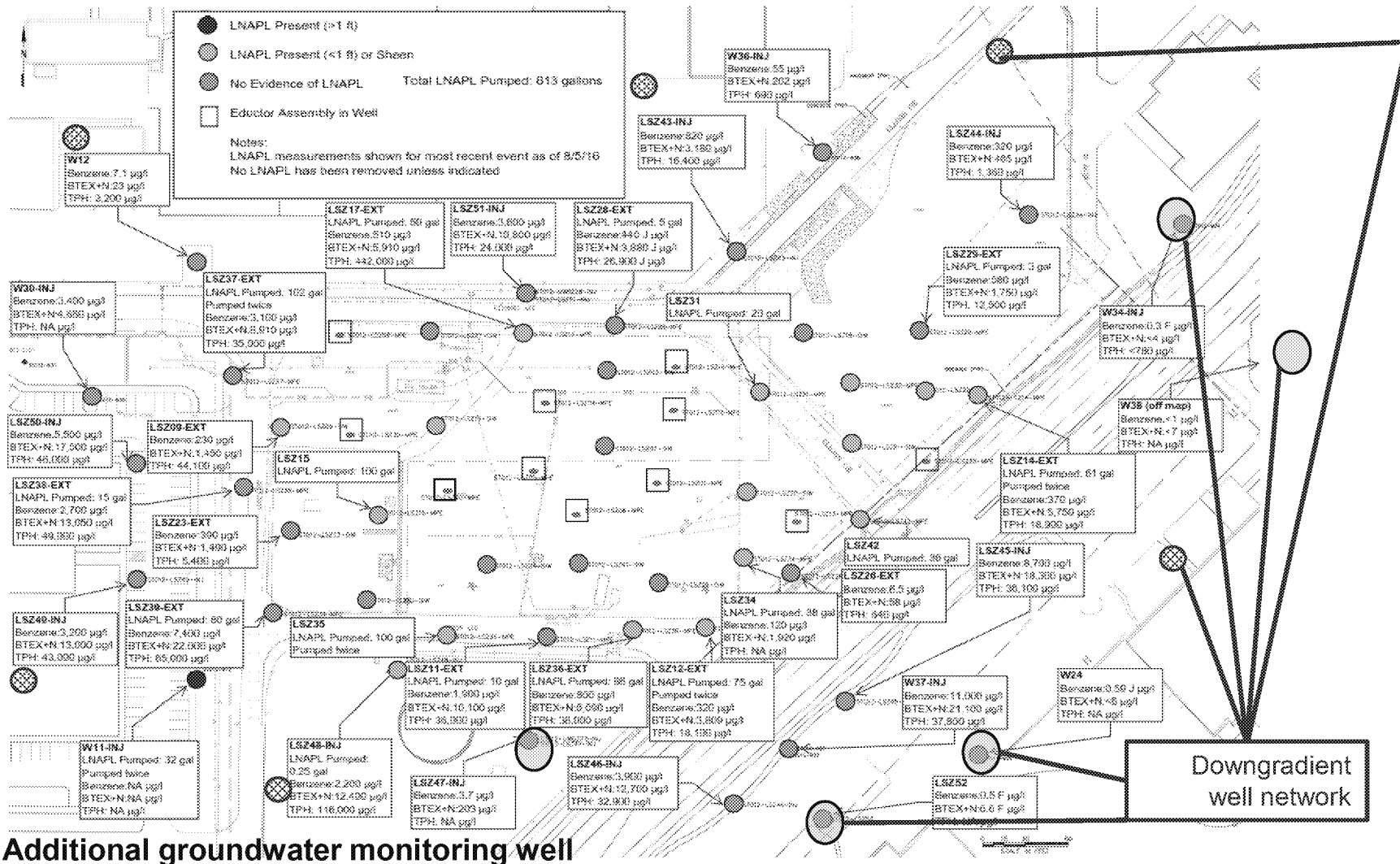


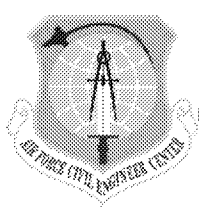
# Site ST012 UWBZ Containment Monitoring





# Site ST012 LSZ Containment Monitoring



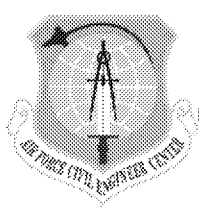


# **ST012**

## **RD/RAWP**

### **Addendum 2**

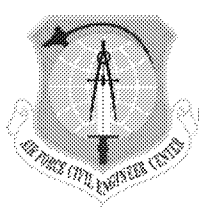
# **Response to Comments**



# Site ST012 RD/RAWP Addendum #2 RTCs

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- **Response to Comments submitted to agencies on Aug 22, 2016**
  - **Mass of LNAPL outside of TTZs**
  - **EBR as a method for source treatment**
  - **Amendment secondary effects (arsenic, sulfate, salinity)**
  - **Injection Permit requirements**



# ST012 Path Forward

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- **Continue SVE operation with flame oxidizer and thermal oxidizer, evaluate connection of additional CZ well(s)**
- **Continue monitoring/pumping of LNAPL in SEE and perimeter wells**
- **Proceed with Phase 2 borings and wells under Field Variance Memorandum**
- **Phase 2 drilling can be started by Sep 19, 2016 if acceptable to EPA/ADEQ**
- **Obtain and evaluate Phase 2 data for LNAPL and dissolved phase characterization (3 months)**
- **Construct active containment capability (2 month duration for construction, 100 gpm extraction/treatment system, existing design)**

# Air Force Civil Engineer Center

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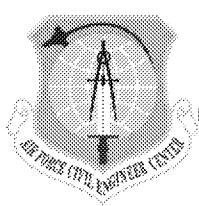
**Site LF004 Landfill  
Remedial Action**



**BCT Meeting  
24 August 2016**

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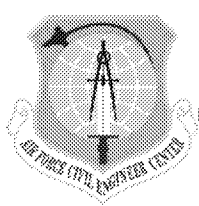
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## Operations Summary through 5 Aug 2016

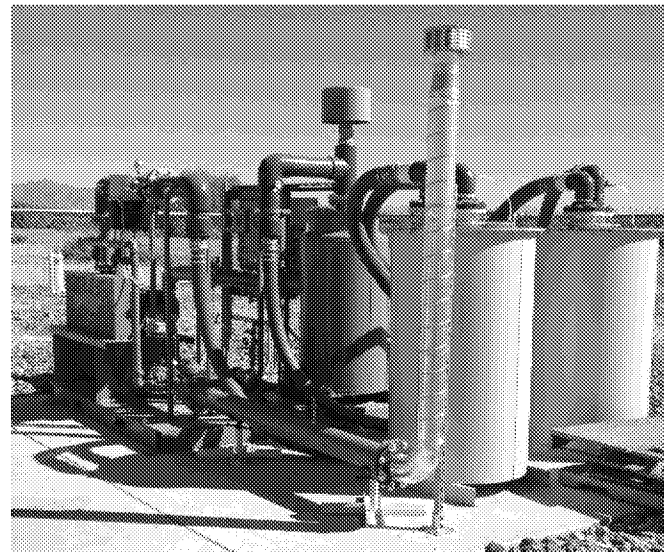
- Began operation 9 Sep 2014 to Nov 2015 (15 months of continuous operation)
- Shutdown for rebound testing Nov 2015-Jan 2016
- SVE system restarted and operated Jan 2016 thru Apr 2016
- Analytical data (May 2016) indicates TCE and PCE concentration remained below soil vapor goals for groundwater protection (SVSLs) in all SVE wells and VMPs except TCE in SVE6-D (5 mg/m<sup>3</sup> vs 2 mg/m<sup>3</sup>)
- All shallow wells TCE and PCE remain below soil vapor goals for indoor vapor intrusion
- SVE system shutdown in May 2016. SVE6-D connected to IWAS system
- 93.6 pounds of TCE and PCE removed by SVE during entire operational period

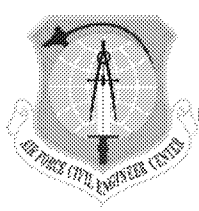




## Operations Summary through 5 Aug 2016

- Began operation 29 Aug 2014  
(approximately 22 months of operation)
- Average 99% operational uptime for reporting period
- TCE and PCE concentrations in extracted vapor are 640 and 120 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), respectively (Jul 2016); extracted vapor concentrations remain low. Air sparging shut down in Aug 2015 to increase soil gas mass removal (extracted vapor concentrations higher without air sparging)
- SVE 6D connected to IWAS system in May 2016
- Estimated 8.7 pounds of TCE and PCE removed by vapor extraction; 0.7 pounds since 8 Jul 2016
- Additional oxidant injection and recirculation scheduled in Aug 2016 at W30-M
- All remediation wells operating



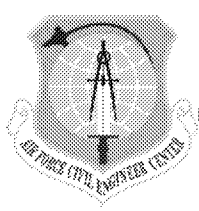


# Southeast Landfill SVE System Update

## Operations Summary through 5 Aug 2016

- Began operation 12 Sep 2014 (15 months of continuous operation)
- Shutdown for rebound testing Nov 2015-Jan 2016
- SVE system restarted and operated Jan 2016 thru Apr 2016
- Analytical data (Jun 2016) indicates TCE and PCE concentration remained below soil vapor goals (SVSLs) for vapor intrusion in all shallow SVE wells and VMPs
- Analytical data (Jun 2016) indicates PCE concentration slightly above soil vapor goals (SVSLs) for groundwater protection in SVE-7M and SVE-7D (6.2 mg/m<sup>3</sup> and 8.2 vs 3.6 mg/m<sup>3</sup>), respectively.
- 36.9 pounds of PCE and TCE removed by SVE during entire operational period



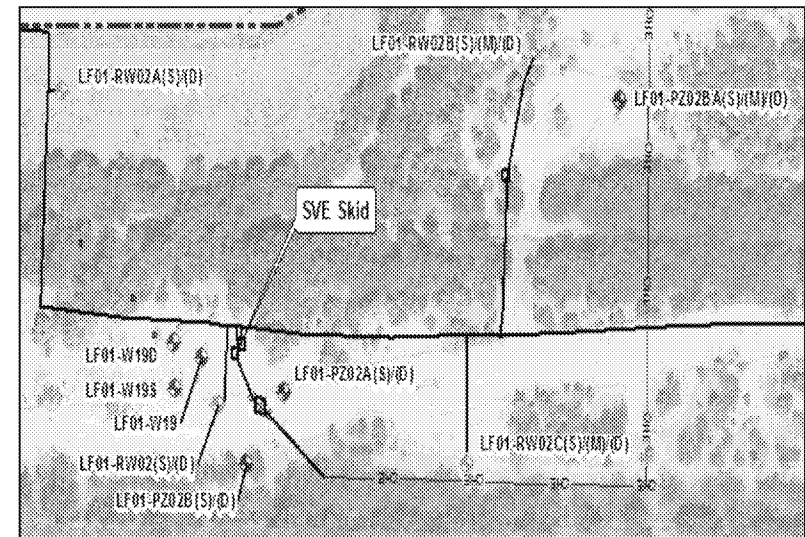


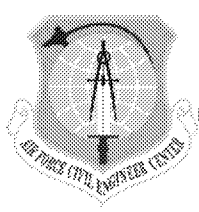
# Site LF004

## Southern Area Oxidant Injection

### Activity Summary through 5 Aug 2016

- Began operation 15 Sep 2014 (approximately 22 months of operation)
- Field screening of residual oxidant ongoing
- Last injection completed week of 27 Feb 2016 at LA06-S and W19-S
- Oxidant concentrations range from 1 to 125 mg/L in LF01-W19 area and 1 to 200 mg/L in LF01-W17 area





## **LF004 Remediation System Recent and Upcoming Activities**

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- **Operation of IWAS and Southern Area remediation wells will continue**
- **Oxidant injection and recirculation at LF01-W30M**
- **AST and SE Landfill SVE systems have been shutdown since May 2016**
- **Focused extraction at SVE6-D (AST) by IWAS system**
- **Continue quarterly soil vapor sampling**
- **Final Landfill Inspection Report submitted (no ADEQ comments)**
- **2016 landfill inspection tentatively schedule in Sep; Coordination with ADEQ during inspection.**
- **Next groundwater semi-annual sampling event in Nov 2016**
- **Posting of analytical data to Sharepoint will continue as results are available**
- **LF004 Operating Properly and Successfully report in preparation. Anticipated submittal is Sep 2016.**

# Air Force Civil Engineer Center

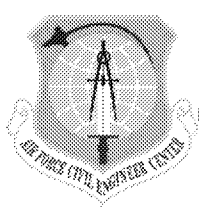
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**Site FT002  
Fire Training Area Remedial  
Action**



**BCT Meeting  
24 August 2016**



# **Site FT002 Update and Path Forward**

- **FT002 closure report under AF review. Anticipated submittal is Sep 2016.**

# **Air Force Civil Engineer Center**

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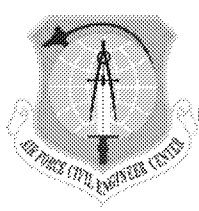
***FORMER  
WILLIAMS AIR FORCE BASE  
Five-Year Review***



**BCT Meeting  
24 August 2016**

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# **Five-Year Review Path Forward**

## ■ **Tentative report schedule**

- **Draft submitted on Aug 8, 2016; under regulatory review**
- **Agency review Aug/Sep 2016**
- **Comment resolution Aug/Sep 2016 (A Draft Final is not anticipated); Conference call can be set up to expedite comment resolution**
- **Final on September 30, 2016**

# **Air Force Civil Engineer Center**

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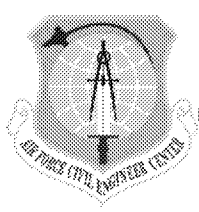


***FORMER  
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Site ST035  
Former Building 760***

**BCT Meeting  
24 August 2016**

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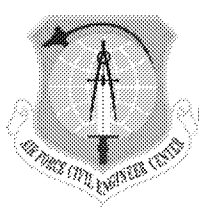
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# ST035 Path Forward

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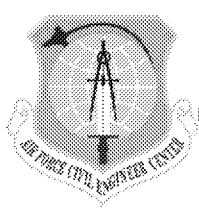
- **Annual 2015 Groundwater Monitoring Report under AF review (results presented in January 2016 BCT Meeting)**
- **May 2016 Groundwater Monitoring Data (results in following slides)**
- **Site closure report under AF review; Draft submittal in Aug 2016**
- **Continue semiannual groundwater monitoring until site closure is obtained which is anticipated to be Oct 2016**
- **Once site closure has been obtained, groundwater sampling at ST035 will be discontinued and monitoring wells will be abandoned**



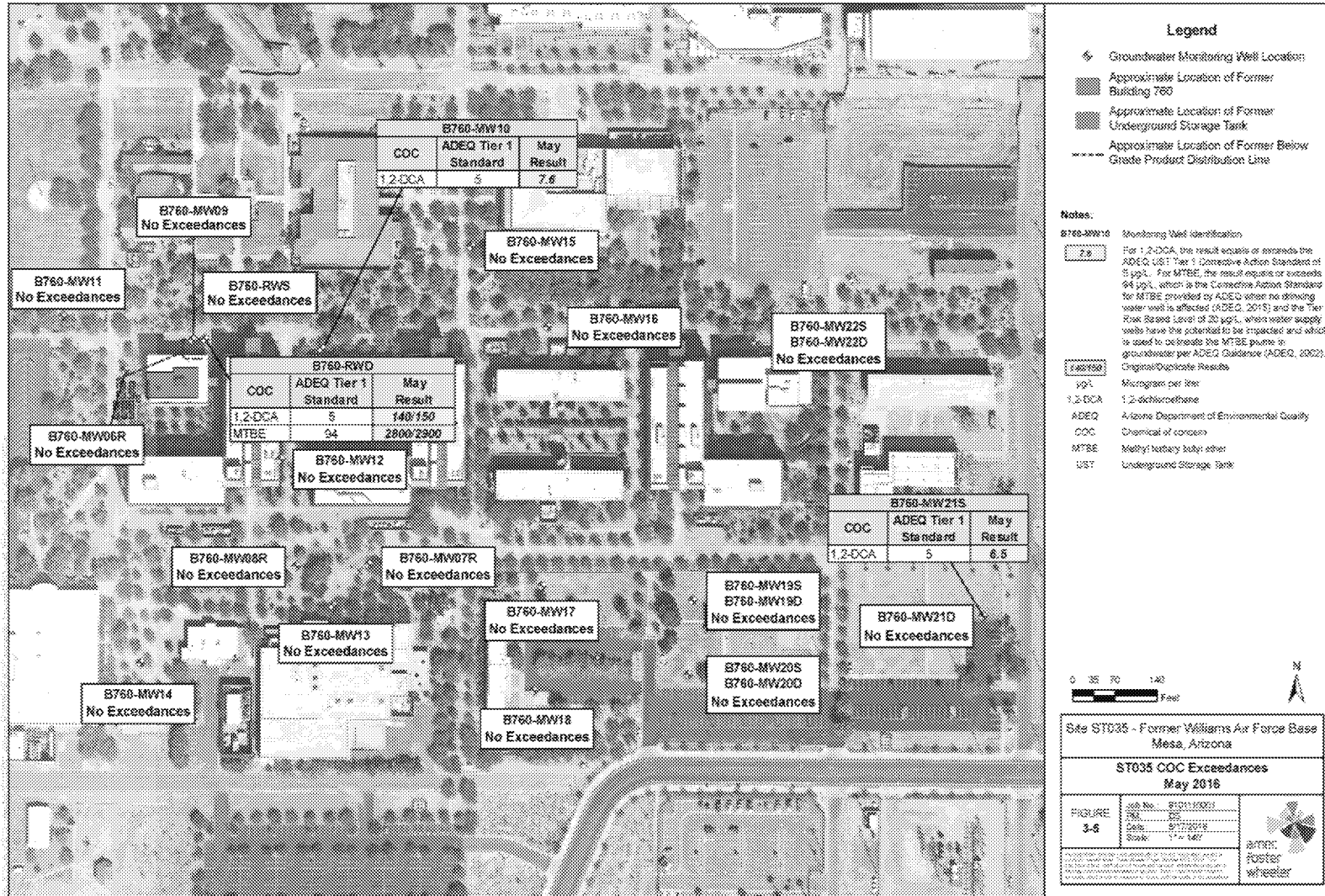
# Site ST035 May 2016 Groundwater Monitoring

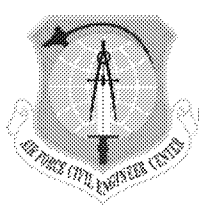
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- All monitoring wells (23) sampled in May 2016
- Exceedances of MTBE (2800 µg/L) and 1,2-DCA (140 µg/L) seen in B760-RWD. Results consistent with November 2015 sampling.
- Two additional exceedances of 1,2-DCA in B760-MW10 (7.6 µg/L) and B760-MW21S (6.5 µg/L)
- 1,2-DCA plume footprint has decreased significantly in the last 15 months
- Groundwater flow direction – predominantly east
- Closure Report has been prepared and is under AF review

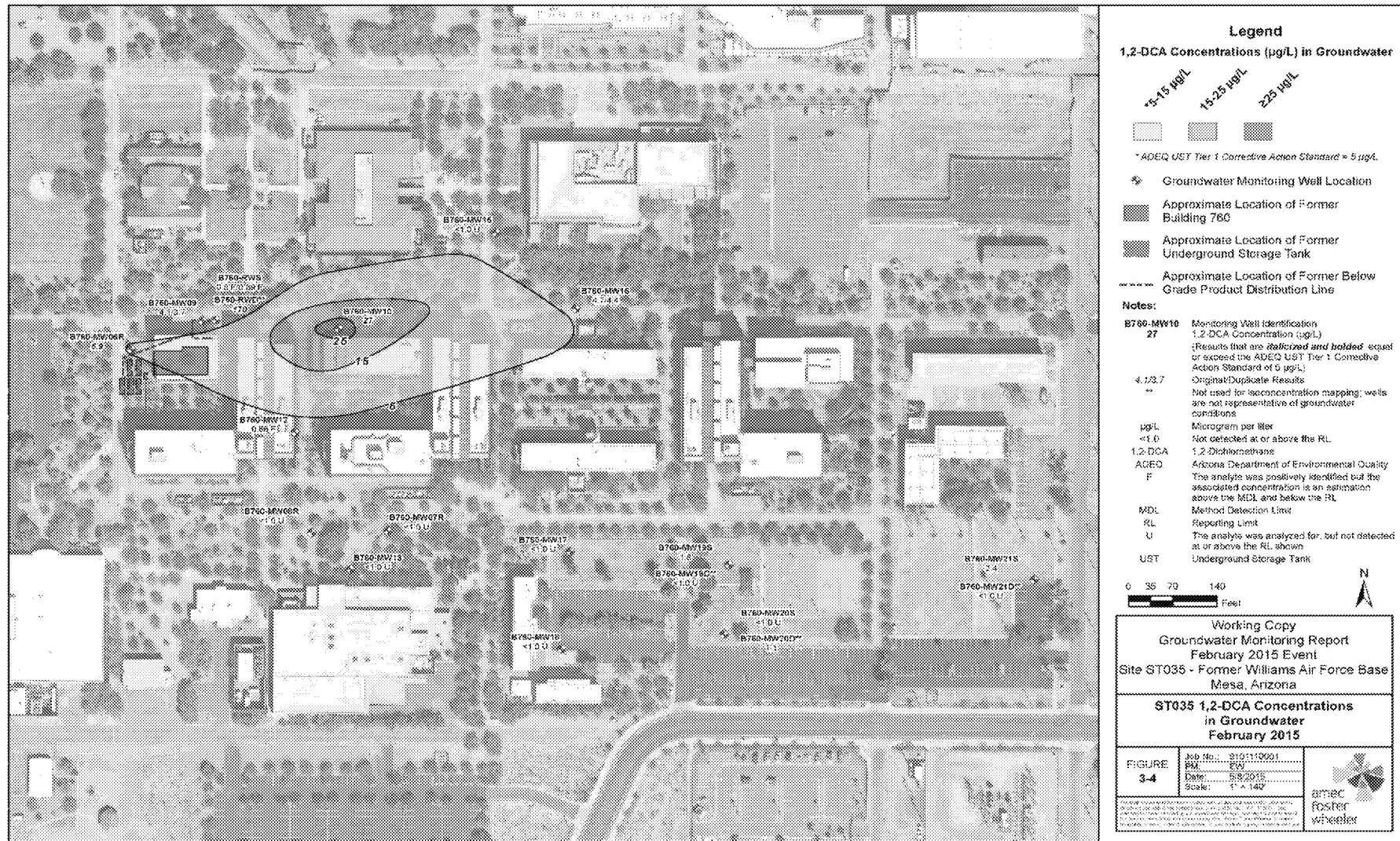


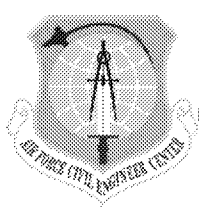
# Site ST035 Groundwater Sampling Results for COCs May 2016





# ST035 Groundwater Sampling Results for 1,2-DCA February 2015





# ST035 Groundwater Sampling Results for 1,2-DCA

## November 2015



**Legend**

**1,2-DCA Concentrations (µg/L) in Groundwater**

■ \*5-15 µg/L

\* ADEQ UST Tier 1 Corrective Action Standard = 5 µg/L

◆ Groundwater Monitoring Well Location

■ Approximate Location of Former Building 760

■ Approximate Location of Former Underground Storage Tank

--- Approximate Location of Former Below Grade Product Distribution Line

**Notes:**

**B760-MW10** Monitoring Well Identification

**11** 1,2-DCA Concentration (µg/L)

(Results that are *italicized and bolded* equal or exceed the ADEQ UST Tier 1 Corrective Action Standard of 5 µg/L)

**1.5/1.7** Original/Duplicate Results

**\*\*** Not used for isoc concentration mapping, wells are not representative of groundwater conditions

**µg/L** Microgram per liter

**<1.6** Not detected at or above the RL

**1,2-DCA** 1,2-Dichloroethane

**ADEQ** Arizona Department of Environmental Quality

**F** The analyte was positively identified but the associated concentration is an estimation above the MDL and below the RL

**MDL** Method Detection Limit

**RL** Reporting Limit

**U** The analyte was analyzed for, but not detected at or above the RL shown

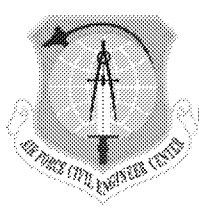
**UST** Underground Storage Tank

0 35 70 140 Feet

Working Copy  
Annual 2015  
Groundwater Monitoring Report  
Site ST035 - Former Williams Air Force Base  
Mesa, Arizona

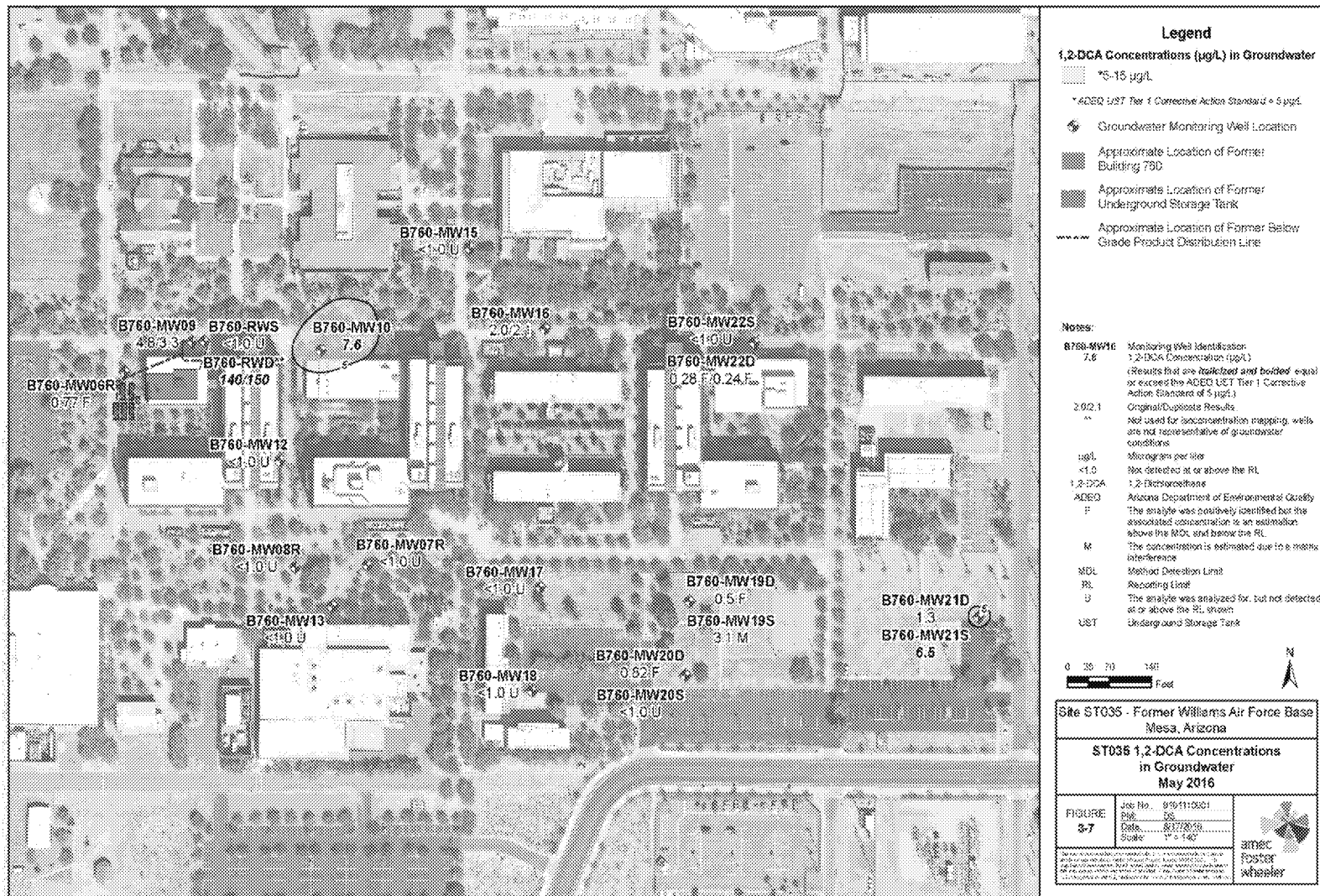
ST035 1,2-DCA Concentrations  
in Groundwater  
November 2015

FIGURE 3-4	Job No.: 9101150001 Date: 11/15/2015 Scale: 1" = 140'	amtec foster white
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# ST035 Groundwater Sampling Results for 1,2-DCA

## May 2016



# **Air Force Civil Engineer Center**

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## ***2016 BCT MEETINGS/CONFERENCE CALLS SCHEDULE***

BCT Meeting  
24 August 2016

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## **BCT GENERAL UPDATE**



**BCT Meeting  
24 August 2016**

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# Air Force Civil Engineer Center

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## ACTION ITEMS



**BCT Meeting  
24 August 2016**

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